

# EXHIBIT 1

# **Michael J. Schulz, M.S.**

## ***President/Principal Consultant***

**M.J. Schulz & Associates, Inc.**  
915 Highland Pointe Drive  
Suite 250  
Roseville, California 95678

Telephone – (800) 310-2891  
Cell – (630) 258-9472  
Email – mjschulz@mjschulz.com  
www.mjschulz.com

## **Curriculum Vitae**

**June 1, 2023**

### **PROFESSIONAL BACKGROUND**

Currently tasked in Metropolitan Sacramento, M.J. Schulz & Associates, Inc. is an internationally known consulting firm focusing on safety, security, and emergency management issues with a specialized emphasis in the investigation and analysis of hostile fire and explosion incidents.

As the President and Principal Consultant, he has been in practice for over forty-two years and has consulted in the United States, Canada, Mexico, Puerto Rico, and Europe. During that forty-two-year professional career, he has served as a civil defense officer, municipal law enforcement officer, fire department command officer, private consultant, and college professor.

He holds a Master of Science (M.S.) in Safety, Security and Emergency Management from Eastern Kentucky University and a Bachelor of Science (B.S.) in Fire and Safety Engineering Technology from the University of Cincinnati. He also holds a certificate in Fire Science from the University of Cincinnati.

He maintains current educational and experiential proficiency as required by National Fire Code NFPA 1033, Sections 1.3.7 and 1.3.8, in investigation technology, fire protection technology and code requirements and, more specifically, fire science, fire chemistry, thermodynamics, thermometry, fire dynamics, explosion dynamics, computer fire modeling, fire investigation, fire analysis, fire investigation

methodology, fire investigation technology, hazardous materials and failure analysis and analytical tools through the professional education and training enumerated herein.

In addition to his consulting practice, he developed and previously served as the Program Director for the Master of Arts (M.A.) in Emergency Management Leadership Graduate Program at Adler University in Chicago, Illinois. Besides his academic responsibilities, he also previously served as Chairman of the institution's Program Development Committee, which is responsible for the academic design and approval process of all new or revised academic programs, concentrations, and tracts. More recently he was appointed by the institution's President to serve on the Strategic Planning Committee.

His specialized emphasis and participation in the field of fire and explosion investigation and analysis has spanned most of his professional career.

He is a graduate of the United States Fire Administration's National Fire Academy (NFA) in Emmitsburg, Maryland, where he completed the Fire and Arson Investigation residency program. He later served as a field instructor for the National Fire Academy delivering the "Fire/Arson Detection" program

He was a charter member of the National Fire Protection Association's (NFPA) Technical Committee on Fire Investigations having been appointed to the committee at the time of its formation by the National Fire Protection Association's Standards Council. During his seventeen (17) year tenure as a principal member of the technical committee, he made significant contributions to both the National Fire Code 907M, entitled Manual for the Determination of Electrical Fire Causes, and the National Fire Code 921, entitled Guide for Fire and Explosion Investigations. He continued to serve on the committee as an alternate member for many years thereafter.

He also served as a member of both the International Fire Service Training Association (IFSTA) Fire Investigator and Fire Origin and Cause Material Review Committees. The Material Review Committees are responsible for the continuing review and revision of the Association's publications, entitled, Fire Investigator and Fire Origin and Cause.

He has served as a consultant to the federal government, including the Federal Emergency Management Agency's, United States Fire Administration's National Fire Academy, state governments and local governments. Recently, he was retained as an expert in the field of fire and explosion investigation and analysis by the Illinois Attorney General's Office and the Illinois State Fire Marshal's Office in federal litigation to which the State of Illinois was a party.

He was selected as an instructor for the Canadian Province of Ontario's Technical Standards and Safety Authority (TSSA) and previously be the U.S Consumer Product Safety Commission (CPSC) to provide training to the Commission's product safety field investigation staff.

He has particular expertise in the forensic investigation and analysis of motor vehicle fires of all types including post-collision motor vehicle fire incidents. Throughout his career, has endeavored to enhance his professional education, knowledge and investigative skills through various academic achievements including, but not limited to the following:

- Certified Vehicle Fire Investigator (CFVI)  
National Certification Board  
National Association of Fire Investigators
- Fire Investigation for Fire Officers Multi-Program with Concentration in Motor Vehicles  
International Association of Arson Investigators and CFITrainer.net
- Traffic Accident Investigation  
Northwestern University Traffic Institute
- Instructor – Motor Vehicle Fire Investigation  
National Certification Board  
National Association of Fire Investigators
- Instructor – Motor Vehicle Fire Investigation  
National Fire Protection Association

Given his keen understanding of fire behavior and fire dynamics, he has also often been asked to consult on the investigation and analysis of major wildland fire incidents. Those historical wildland fire incidents included:

- Chariot Fire, San Diego County, California, July 2013
- Witch Creek Fire, San Diego County, California, November 2017

More recently, he was retained by the Plaintiffs' Steering Committee (PSC) overseeing the comprehensive North Bay Wildland Fires litigation in Northern California which was comprised of a number of different wildland fire incidents. At the time of settlement of that litigation, he was actively assisting in the development of demonstrative trial exhibits to be utilized in the Tubbs Fire civil trial as part of that assignment. Those incidents included:

- Wall Fire, Butte County, California, July 2017
- Tubbs Fire, Napa/Sonoma County, California, October 2017
- Redwood Valley Fire, Mendocino County, California, October 2017
- Atlas Fire, Napa County, California, October 2017
- Sulphur Fire, Lake County, California, October 2017
- Cascade Fire, Yuba County, California October 2017
- Cherokee Fire, Butte County, California, October 2017
- Patrick Fire, Napa County, California, October 2017

- Nuns Fire, Napa County, California, October 2017
- LaPorte Fire, Butte County, California, October 2017
- Lobo Fire, Butte County, California, October 2017
- McCourtney Fire, Butte County, California, October 2017
- Honey Fire, Butte County, California, October 2017
- Pocket Fire, Sonoma County, California, October 2017
- Pythian Fire, Sonoma County, California, October 2017
- 37 Fire, Sonoma County, California, October 2017
- Camp Fire, Butte County, California, November 2018

Most recently, he was retained by a consortium of multiple clients to also consult on the investigation and analysis of a series of wildland fire incidents and associated debris flows which occurred in California, Oregon, and Washington in recent years. Those incidents include:

- Mission Fire/Madera County, California, September 2017
- Thomas Fire, Ventura County, California, December 2017
- Koenigstein Fire, Ventura County, California, December 2017
- Creek Fire, Los Angeles County, California, December 2017
- Holiday Fire, Santa Barbara County, California, July 2018
- Woolsey Fire, Ventura County, California, October 2018
- Getty Fire, Los Angeles County, California, October 2019
- Kincade Fire, Sonoma County, California, October 2019
- Beachie Creek Fire, Marion County, Oregon, August 2020
- South Oberchain Fire, Jackson County, Oregon, September 2020
- Two-Four Two Fire, Lake County, Oregon, September 2020
- Santiam Canyon Fire, Marion County, Oregon, September 2020
- Whitney Fire, Lincoln County, Washington, September 2020
- Glass Fire, Napa County, California, September 2020
- Zogg Fire, Shasta County, California, September 2020
- Archie Creek Fire, Douglas County, Oregon, September 2020
- Bobcat Fire, Los Angeles County, California, September 2020
- Slater Fire, Siskiyou County, California, October 2020
- Silverado Fire, Orange County, California, October 2020
- Pope Fire, Napa County, California, October 2020
- Calwood Fire, Boulder County, Colorado, October 2020
- Laura 2 Fire, Lassen County, California, November 2020
- Pinehaven Fire, Washoe County, Nevada, November 2020
- Mountain View Fire, Mono County, California, November 2020
- Echo Mountain Fire, Lincoln County, December 2020.
- Creek Fire, San Diego County, California, December 2020
- Cerritos Fire, Riverside County, California, December 2020
- Bonita Fire, Riverside County, California, January 2021
- Dixie Fire, Butte County, California, July 2021



- Fly Fire, Plumas County, California, July 2021
- Caldor Fire, El Dorado, California, August 2021
- West Wind Fire, Judith Basin County, Oregon, November 2021
- Coastal Fire, Orange County, California, May 2022
- McKinney Fire, Siskiyou County, Oregon, July 2022
- Mosquito Fire, Placer County, California, September 2022
- Mill Fire, Siskiyou County, California, September 2022
- Fairview Fire, Riverside County, September 2022

He holds national registration as a National Board Certified Fire and Explosion Investigator (CFEI), a National Board Certified Vehicle Fire Investigator (CVFI) and a National Board Certified Fire Investigation Instructor (CFII) through the National Association of Fire Investigators' National Certification Board. He also holds international registration as a Certified Canadian Fire Investigator (CCFI) through the Canadian Association of Fire Investigators' National Certification Committee. He also holds national registration as a Certified Fire Protection Specialist (CFPS) through the National Fire Protection Association and the Certified Fire Protection Specialist Board.

His professional affiliations include the National Fire Protection Association (NFPA), the American Society of Safety Engineers (ASSE), the National Fire Academy Alumni Association (NFAAA), the National Association of Fire Investigators (NAFI), the International Association of Arson Investigators (IAAI), the Illinois Chapter of International Association of Arson Investigators (IL-IAAI), the California Conference of Arson Investigators (CCAI), the Canadian Association of Fire Investigators (CAFI), the Society of Fire Protection Engineers (SFPE), the American Society for Testing and Materials (ASTM), the Society of Automotive Engineers (SAE) and the American Radio Relay League (ARRL).

His academic affiliations include the Phi Kappa Phi Honors Society, the University of Cincinnati Alumni Association, and the Eastern Kentucky University Alumni Association.

## **FORMAL EDUCATION**

Eastern Kentucky University, Richmond, KY  
Master of Science (M.S.) in Safety, Security and Emergency Management  
Honors: 4.0 Cumulative GPA  
December 2012

University of Cincinnati, Cincinnati, OH  
Bachelor of Science (B.S.) in Fire and Safety Engineering Technology  
Honors: Magna cum Laude 3.86 Cumulative GPA  
June 1996

University of Cincinnati, Cincinnati, OH  
Certificate in Fire Science  
United States Fire Administration Open Learning Fire Service Program  
June 1996

## **PROFESSIONAL EXPERIENCE**

M.J. Schulz & Associates, Inc., Roseville, CA  
President – Principal Consultant  
Private Consulting Firm  
2000 – Present

Adler University, Chicago, Illinois  
Professor/Program Director  
Emergency Management Leadership Program  
2013 - 2016

Foundations of Emergency Management (EML 500)

Law and Politics of Emergency Management (EML 501)

Supporting Functional Needs Populations in Disasters (EML 502)

Disaster Response, Recovery and Continuity (EML 503)

Psychology of Terrorism (EML 504)

Leading in Times of Disaster (EML 505)

Essentials of Effective Communication (EML 506)

Research Methods for Leaders in Emergency Management (EML 507)

Group, Organization and System Development (EML 508)

Private Sector Emergency Management Strategies (EML 509)

Disaster Mental and Behavioral Health Applications in Emergency  
Management (EML 510)

Emerging Issues in Emergency Management and Homeland Security  
(EML 511)

Capstone Project (EML 512)

Adler University, Chicago, Illinois  
Professor  
Police Psychology Program

Psychology of Leadership (MAP 757)

DuPage County Amateur Radio Emergency Service, Wayne, Illinois  
Emergency Coordinator  
Auxiliary Emergency Communications Team

William Rainey Harper Community College, Palatine, Illinois  
Adjunct Instructor  
Fire Science Program

Principles of Fire Prevention IV

SCS Research Group, Rolling Meadows, Illinois  
Consultant  
Private Consulting Firm  
2000 - 2000

John A. Kennedy & Associates, Inc., Hoffman Estates, Illinois  
Senior Staff Expert  
Private Consulting Firm  
1990 - 2000

Cedarburg Police Department, Cedarburg, Wisconsin  
Municipal Police Officer  
Municipal Police Department  
1979 - 1990

Cedarburg Fire Department, Cedarburg, Wisconsin  
Captain – Fire Prevention Company  
Municipal Fire Department  
1981 - 1990

Milwaukee Area Technical College, Milwaukee, Wisconsin  
Adjunct Instructor  
Fire Science Program

Fire Investigation



Milwaukee Area Technical College, Milwaukee, Wisconsin  
Adjunct Instructor  
Police Science Program

Arson Investigation

## **PROFESSIONAL CERTIFICATES**

University of Cincinnati, Cincinnati, OH  
Certificate in Fire Science  
United States Fire Administration Open Learning Fire Service Program  
June 1996

Principles of Fire Investigation Multi-Program  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Fire Investigation for Fire Officers Multi-Program with Concentration in  
Motor Vehicles  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Fire Investigation for Fire Officers Multi-Program with Concentration in  
Youth Set Fires  
International Association of Arson Investigators and CFITrainer.net  
December 2019

## **CURRENT PROFESSIONAL CERTIFICATIONS/DESIGNATIONS**

Certified Fire Protection Specialist (CFPS)  
Certified Fire Protection Specialist Board  
National Fire Protection Association

Certified Fire and Explosion Investigator (CFEI)  
National Certification Board  
National Association of Fire Investigators

Certified Vehicle Fire Investigator (CFVI)  
National Certification Board  
National Association of Fire Investigators

Certified Fire Investigation Instructor (CFII)  
National Certification Board  
National Association of Fire Investigators

Canadian Certified Fire Investigator (CCFI)  
National Certification Committee  
Canadian Association of Fire Investigators

Professional Development Series Certification (PDS)  
Illinois Emergency Management Agency

Communications Unit Leader (COML)  
Department of Homeland Security  
Federal Emergency Management Agency/Office of Emergency  
Communications

Auxiliary Emergency Communicator (AEC)  
Department of Homeland Security  
Federal Emergency Management Agency/Office of Emergency  
Communications

## **PREVIOUS PROFESSIONAL CERTIFICATIONS/DESIGNATIONS**

Certified Fire Service Instructor II  
Board of Vocational, Technical and Adult Education  
State of Wisconsin

Certified Fire Service Instructor I  
Board of Vocational, Technical and Adult Education  
State of Wisconsin

Certified Emcomm Field Instructor (FI)  
Continuing Education Program  
American Radio Relay League

Certified Emcomm Field Examiner (FE)  
Continuing Education Program  
American Radio Relay League

## **PROFESSIONAL BUSINESS LICENSURES**

Registered Class 1 Private Detective Agency  
License Number 117001067  
Department of Financial and Professional Regulation  
State of Illinois

Registered Class A Private Detective  
License Number 115-001562  
Department of Financial and Professional Regulation  
State of Illinois

Registered Permanent Employee  
Registration Card Number 129-117390  
Department of Financial and Professional Regulation  
State of Illinois

Class A Investigation Company  
License Number A 10054  
Department of Public Safety  
State of Texas

Owner  
License Number A 10054  
Department of Public Safety  
State of Texas

## **EMERGENCY MEDICAL CERTIFICATIONS**

Adult First Aid/CPR/AED  
American Red Cross

## **PROFESSIONAL COMMUNICATIONS LICENSURE**

Federal Communications Commission, Washington, D.C.  
Amateur Extra Class: Call Sign - W9MJS  
FRN 0009322181

Federal Communications Commission, Washington, D.C.  
GMRS: Call Sign - WQIR430  
FRN 0009322181

## **NATIONAL FIRE ACADEMY GRADUATE**

Fire and Arson Investigation, Emmitsburg, Maryland  
United States Fire Administration  
Residency Program

Selection, acceptance, and an invitation to the National Fire Academy is achieved by an evaluation of qualifications, training, and experience and by the successful completion of a comprehensive nomination and application process. His nomination was submitted and endorsed by both the municipal police department and municipal fire department in the jurisdiction in which he served following his graduation. He was one of a limited number of municipal law enforcement officers from his state to have been selected and invited to attend.

## **NATIONAL FIRE ACADEMY FIELD PROGRAM**

Fire/Arson Detection, Emmitsburg, Maryland  
United States Fire Administration  
Train-the-Trainer Program

Having completed the requisite Train-the-Trainer coursework, he has served as a field instructor for the National Fire Academy's Field Program entitled, "Fire/Arson Detection." In that capacity, he has trained hundreds of law enforcement and fire service personnel.

## **CONSULTANT TO FEDERAL EMERGENCY MANAGEMENT AGENCY**

United States Fire Administration, Emmitsburg, Maryland  
Arson Prevention Act of 1994 Working Group  
Content Expert

He was contracted to serve as a training course Content Expert directing and overseeing the revision of current federal fire investigation training programs administered by the United States Fire Administration's National Fire Academy, as well as the development of a new federal fire investigation training program as part of the mandates by the United States Congress under the Arson Prevention Act of 1994. In that capacity, he was selected to serve as a chairman of one of the two working task groups.

United States Fire Administration, Emmitsburg, Maryland  
National Symposium for Arson Prevention and Control  
Delegate

He was also selected as one of only sixty delegates from across the nation to the United States Fire Administration and National Fire Academy's National Symposium for Arson Prevention and Control, held in Emmitsburg, Maryland in July 1995. The symposium serves to advise the United States Fire Administration and its National Fire Academy on the goals and objectives of their respective arson prevention and control programs.

## **CODES AND STANDARDS DEVELOPMENT PROCESS PARTICIPANT**

Technical Committee on Fire Investigators  
National Fire Protection Association  
Principal Committee Member

Fire Origin and Cause Material Review Committee  
International Fire Service Training Association  
Principal Committee Member

Fire Investigator Material Review Committee  
International Fire Service Training Association  
Principal Committee Member

Technical Committee on Fire Investigations  
National Fire Protection Association  
Alternate Committee Member

He has extensive knowledge in the development, interpretation and application of laws, codes, standards, and recommended practices that focus on issues arising from the investigation and analysis of fires and explosions.

During his tenure with the fire service, he was responsible for supervising a municipal fire department's code development, fire inspection and code enforcement activities. He was also assigned to a mayoral task group that developed and implemented a revised municipal fire prevention code. During that assignment, he authored many portions of that new fire prevention code.

His involvement in the codes and standards making process provides him with a unique and specialized insight into the development, interpretation and application of such laws, codes, standards, and recommended practices.

His professional training, education and experience include, but is not limited to, the interpretation and application of such codes and standards as the following:

- National Fire Protection Association (NFPA)
- American National Standards Institute (ANSI)
- International Code Council (ICC)
- Building Officials and Code Administrators International (BOCA)
- Southern Building Code Congress International (SBCCI)
- International Code and Buildings Officials (ICBO)
- American Insurance Institute (AIA)
- American Society for Testing and Materials (ASTM)
- Underwriter's Laboratories, Incorporated (UL)
- Canadian Standards Association (CSA)
- National Institute of Standards and Technology (NIST)
- Code of Federal Regulations (CFR)
- Occupational Safety and Health Administration (OSHA)
- Department of Transportation (DOT)
- Consumer Products Safety Commission (CPSC)
- Airline Transport Association (ATA)

## **CONTINUING LAW ENFORCEMENT EDUCATION**

Wisconsin Certified Law Enforcement Officer Training  
State of Wisconsin, Department of Justice, Training and Standards Board  
March 1979

Death Investigation  
State of Wisconsin, Department of Justice, Division of Criminal Investigation  
September 1979

Police In-Service Recertification  
Milwaukee Area Technical College  
1980

Police In-Service Recertification  
Milwaukee Area Technical College  
1981

Police In-Service Recertification  
Milwaukee Area Technical College  
1982



Police In-Service Recertification  
Milwaukee Area Technical College  
1983

Police In-Service Recertification  
Milwaukee Area Technical College  
1984

Effective Use of Photography as Legal Evidence  
University of Wisconsin, Department of Engineering and Applied Science  
May 1985

Police In-Service Recertification  
Milwaukee Area Technical College  
1985

Police In-Service Recertification  
Milwaukee Area Technical College  
1986

Police In-Service Recertification  
Milwaukee Area Technical College  
1987

Police In-Service Recertification  
Milwaukee Area Technical College  
1988

Police In-Service Recertification  
Milwaukee Area Technical College  
1989

Traffic Accident Investigation  
Northwestern University Traffic Institute  
September 2000

## **CONTINUING FIRE SERVICE EDUCATION**

Crash Injury Management Technician  
Waukesha Area Technical College  
March 1979

Basic Course on Handling Hazardous Materials Emergency Incidents  
State of Wisconsin, Board of Vocational, Technical and Adult Education  
February 1981

Basic Fire Fighting (Firefighter I)  
Milwaukee Area Technical College  
December 1981

Emergency Medical Technician Certification  
Emergency Medical Technician Training Consortium  
February 1982

Advanced Fire Fighting (Firefighter II)  
Milwaukee Area Technical College  
March 1982

Search and Rescue  
International Society of Fire Service Instructors  
September 1982

Fire Ground Commander  
National Fire Protection Association  
October 1982

Operating Fire Department Apparatus  
Milwaukee Area Technical College  
April 1983

EMS Communications  
Moraine Park Technical Institute  
August 1983

Company Officer Leadership  
Association of Ozaukee County Fire Departments  
March 1984

Certified Fire Inspector Training  
State of Wisconsin, Department of Industry, Labor, and Human Relations  
March 1986

Fire Department Instructors Conference  
International Association of Fire Service Instructors  
March 1991

Fire Case Studies Symposium: Office High-Rise Fire Safety  
National Fire Protection Association, Montreal  
November 1991

Fire Codes and Standards Forum  
Fire Marshal's Association of North America  
November 1991

Fire Department Instructors Conference  
International Society of Fire Service Instructors  
April 1992

## **CONTINUING FIRE AND EXPLOSION INVESTIGATION AND ANALYSIS EDUCATION**

15th Annual Wisconsin Arson Training Seminar  
State of Wisconsin, Department of Justice, Division of Criminal Investigation,  
and the Wisconsin Chapter of the International Association of Arson  
Investigators  
June 1980

Arson Investigation  
American Policy Academy  
January 1981

Automobile Fire Investigation  
Badger Firemen's Association  
March 1981

Fire/Arson Detection  
United States Fire Administration's National Fire Academy Field Program  
May 1982

17th Annual Wisconsin Arson Training Seminar  
State of Wisconsin, Department of Justice, Division of Criminal Investigation,  
and the Wisconsin Chapter of the International Association of Arson  
Investigators  
June 1982

Fire and Arson Investigation  
Milwaukee Area Technical College  
April 1983

18th Annual Wisconsin Arson Training Seminar  
State of Wisconsin, Department of Justice, Division of Criminal Investigation,  
and the Wisconsin Chapter of the International Association of Arson  
Investigators  
June 1983

Arson Investigation  
Milwaukee Area Technical College  
February 1984

35th Annual I.A.A.I. Training Conference  
International Association of Arson Investigators, Clearwater Beach  
April 1984

Arson Investigation  
Hillsborough Community College  
April 1984

Fire/Arson Detection  
Wisconsin Board of Vocational, Technical and Adult Education  
May 1984

19th Annual Wisconsin Arson Training Seminar  
State of Wisconsin, Department of Justice, Division of Criminal Investigation,  
and the Wisconsin Chapter of the International Association of Arson  
Investigators  
June 1985

Fire Investigation  
Milwaukee Area Technical College  
September 1984

20th Annual Wisconsin Arson Training Seminar  
State of Wisconsin, Department of Justice, Division of Criminal Investigation,  
and the Wisconsin Chapter of the International Association of Arson  
Investigators  
June 1985

Determining the Cause and Origin of Fires and Explosions  
National Association of Fire Investigators  
August 1985

Fire and Arson Investigation  
United States Fire Administration's National Fire Academy  
June 1986

21st Annual Wisconsin Arson Training Seminar  
State of Wisconsin, Department of Justice, Division of Criminal Investigation,  
and the Wisconsin Chapter of the International Association of Arson  
Investigators  
June 1986

Determining the Cause and Origin of Fires and Explosions  
National Association of Fire Investigators  
August 1986

22nd Annual Wisconsin Arson Training Seminar  
State of Wisconsin, Department of Justice, Division of Criminal Investigation,  
and the Wisconsin Chapter of the International Association of Arson  
Investigators  
June 1987

Determining the Cause and Origin of Fires and Explosions  
National Association of Fire Investigators, Chicago  
August 1987

Determining the Cause and Origin of Fires and Explosions  
National Association of Fire Investigators  
September 1988

Arson-For-Profit Investigative Techniques Seminar  
United States Department of the Treasury, Bureau of Alcohol, Tobacco, and  
Firearms  
January 1989

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 1989

National Conference on Fire Investigation Instruction  
National Association of Fire Investigator  
January 1990

Fire Investigation Course for Professional Development  
Eastern Kentucky University  
March 1990

Fire Investigation Training Seminar  
University of Southern Mississippi  
June 1990

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 1990

Fire Litigation and Explosion Investigation Training Seminar  
HMR Fire Technology Institute  
September 1990

1st Annual Fire and Explosion Investigation Training Program  
Sacramento County Fire Investigation Unit  
November 1990

Fire Investigation Course for Professional Development  
Eastern Kentucky University  
April 1991

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 1991

Fire Investigation and Analysis  
Fire Science and Technology Educators Section Program  
National Fire Protection Association  
November 1991

Advanced Fire Scene Analysis  
National Fire Protection Association  
February 1992

Fire Investigation Course for Professional Development  
Eastern Kentucky University  
March 1992

Human Behavior Task Group Meeting  
National Fire Protection Association  
April 1992

Mathematical Computer Fire Modeling, Special Tutoring Program  
National Institute of Standards and Technology  
June 1992

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 1992



FPETool and Hazard I User's Conference  
National Institute of Standards and Technology  
October 1992

Fire Investigation and Analysis  
National Fire Protection Association  
Fire Science and Technology Educator's Section  
November 1992

Fire Investigation Course for Professional Development  
Eastern Kentucky University  
March 1993

Conference on Community College Fire Science and Technology Core  
Curriculum  
National Fire Protection Association  
September 1993

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 1993

Fire Investigation Course for Professional Development  
Eastern Kentucky University  
March 1994

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 1994

Rocky Mountain Fire, Arson, and Explosion Investigation Training Program  
Aurora Fire Department  
January 1995

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 1995

Washington State Chapter of the International Association of Arson  
Investigators' Annual Training Seminar  
September 1995

Colorado Association of Property and Evidence Technicians' Annual Training  
Seminar  
September 1995

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 1995

Fire Science and Technology Educators' Section Program  
National Fire Protection Association  
November 1995

Eastern Kentucky University's National Advanced Fire, Arson, and Explosion  
Investigation Training Program  
National Association of Fire Investigators  
March 1996

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 1996

Eastern Kentucky University's National Advanced Fire, Arson, and Explosion  
Investigation Training Program  
National Association of Fire Investigators  
March 1997

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
July 1997

Texas Fire, Arson, and Explosion Investigation Training Symposium  
Missouri City Fire Department and Texas A & M University  
September 1997

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
July 1998

Texas Fire, Arson, and Explosion Investigation Training Symposium  
Missouri City Fire Department and Texas A & M University  
August 1998

Investigation of Motor Vehicle Fires  
Lee S. Cole & Associates, Incorporated  
November 1998

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
November 1998

National Seminar on Fire Analysis Litigation  
National Association of Fire Investigators  
January 1999

Eastern Kentucky University's National Advanced Fire, Arson, and Explosion  
Investigation Training Program  
National Association of Fire Investigators  
April 1999

Florida Fire & Explosion Investigation Symposium  
National Association of Fire Investigators  
July 1999

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 1999

Canadian National Fire, Arson, and Explosion Investigation Training  
Program  
National Association of Fire Investigators  
November 1999

National Seminar on Fire Analysis Litigation  
National Association of Fire Investigators  
January 2000

Canadian National Fire, Arson, and Explosion Investigation Training  
Program  
National Association of Fire Investigators  
November 2000

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 2001

Canadian National Fire, Arson, and Explosion Investigation Training  
Program  
National Association of Fire Investigators  
October 2001

Eastern Kentucky University's National Advanced Fire, Arson, and Explosion  
Investigation Training Program  
National Association of Arson Investigators  
April 2002

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 2002

National Seminar on Fire Analysis Litigation  
National Association of Fire Investigators  
January 2002

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
September 2002

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 2002

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 2003

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
October 2003

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 2003

Eastern Kentucky University's National Advanced Fire, Arson, and Explosion  
Investigation Training Program  
National Association of Fire Investigators  
March 2004

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 2004

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
September 2004

Canadian National Fire, Arson, and Explosion Investigation Training  
Program  
National Association of Fire Investigators  
October 2004

Eastern Kentucky University's National Advanced Fire, Arson, and Explosion  
Investigation Training Program  
National Association of Fire Investigators  
March 2005

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 2005

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
September 2005

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 2005

Eastern Kentucky University's National Advanced Fire, Arson, and Explosion  
Investigation Training Program  
National Association of Fire Investigators  
March 2006

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 2006

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 2006

Investigating Motor Vehicle Fires  
International Association of Arson Investigators and CFITrainer.net  
November 2006

Digital Photography and the Fire Investigator  
International Association of Arson Investigators and CFITrainer.net  
November 2006

Ethics and the Fire Investigator  
International Association of Arson Investigators and CFITrainer.net  
November 2006

Fire Investigator Scene Safety  
International Association of Arson Investigators and CFITrainer.net  
November 2006

Fire Dynamics Calculations  
International Association of Arson Investigators and CFITrainer.net  
December 2006

Insurance and the Fire Investigation  
International Association of Arson Investigators and CFITrainer.net  
January 2007

An Analysis of the Station Nightclub Fire  
International Association of Arson Investigators and CFITrainer.net  
January 2007

The Scientific Method for Fire and Explosion Investigation  
International Association of Arson Investigators and CFITrainer.net  
January 2007

MagneTek: A Case Study in the Daubert Challenge  
International Association of Arson Investigators and CFITrainer.net  
February 2007

Eastern Kentucky University's National Advanced Fire, Arson, and Explosion  
Investigation Training Program  
National Association of Fire Investigators  
March 2007

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
August 2007

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
September 2007

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 2007



Introduction to Evidence  
International Association of Arson Investigators and CFITrainer.net  
December 2007

Critical Thinking Solves Cases  
International Association of Arson Investigators and CFITrainer.net  
December 2007

Introduction to Fire Dynamics and Modeling  
International Association of Arson Investigators and CFITrainer.net  
December 2007

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
March 2008

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 2008

Saudi Aramco Fire, Arson and Explosion Investigation Training Program  
Trace Fire Safety Consultants and the National Association of Fire  
Investigators  
November 2008

Fire and Explosion Investigations: Utilizing NFPA 1033 and 921  
International Association of Arson Investigators and CFITrainer.net  
February 2009

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
March 2009

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
September 2009

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 2009

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
March 2010

Saudi Aramco Fire, Arson, and Explosion Investigation Training Program  
Trace Fire Safety Consultants and the National Association of Fire  
Investigators  
August 2010

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 2010

Residential Electricity for Fire Investigators  
Fire Findings Laboratories  
April 2011

Dust Explosion Hazards  
National Fire Protection Association  
May 2011

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
September 2011

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 2011

Northern Zone Fire Investigation Seminar  
Illinois Chapter of the International Association of Arson Investigators  
January 2012

Writing the Initial Origin and Cause Report  
International Association of Arson Investigators and CFITrainer.net  
July 2012

The Fire Investigator and the 2011 NFPA 921 Changes  
International Association of Arson Investigators and CFITrainer.net  
July 2012

How First Responders Impact the Fire Investigation  
International Association of Arson Investigators and CFITrainer.net  
July 2012

Effective Investigation and Testimony  
International Association of Arson Investigators and CFITrainer.net  
July 2012

Wildland Fire Investigations  
International Association of Arson Investigators and CFITrainer.net  
July 2012

Explosion Dynamics  
International Association of Arson Investigators and CFITrainer.net  
August 2012

Search and Seizure  
International Association of Arson Investigators and CFITrainer.net  
August 2012

The Practical Application of the Relationship between NFPA 1033 and NFPA  
921  
International Association of Arson Investigators and CFITrainer.net  
August 2012

29<sup>th</sup> Annual Fire Investigation Training Conference  
Illinois Chapter of the International Association of Arson Investigators  
September 2012

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 2012

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 2013

Technical Standards and Safety Administration Fire Investigation Seminar  
Trace Fire & Safety  
September 2014

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 2014

Understanding Your Role in Fire Data  
National Association of State Fire Marshals Foundation  
November 2014

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
October 2015

Introduction to Fire Behavior (Wildland)  
World of Wildland Fire  
Northern Arizona University and the Wildland Fire Education and Training  
Collaborative (WETC)  
January 2016

Next Generation for Advanced Wildland Fire Training – An Introduction  
Southern Fire Exchange  
March 2017

The Ecology of Fuels (Wildland)  
Southern Fire Exchange  
May 2017

Wildfire Hazard and Risk Assessment  
UN Office for Disaster Risk Reduction  
November 2017

Vacant and Abandoned Buildings: Hazards and Solutions  
International Association of Arson Investigators and CFITrainer.net  
February 2018

Accreditation, Certification and Certificates  
International Association of Arson Investigators and CFITrainer.net  
February, 2018

Understanding the Fire Investigator's Job: A Guide for Non-Investigators  
International Association of Arson Investigators and CFITrainer.net  
February 2018

Physical Evidence at the Fire Scene  
International Association of Arson Investigators and CFITrainer.net  
February 2018

Documenting the Event  
International Association of Arson Investigators and CFITrainer.net  
February 2018

The Importance of Electronic Evidence in Fire Cases  
International Association of Arson Investigators and CFITrainer.net  
February 2018

Motive, Means and Opportunity: Determining Responsibility in an Arson Case  
International Association of Arson Investigators and CFITrainer.net  
February 2018

Using Resources to Validate Your Hypothesis  
International Association of Arson Investigators and CFITrainer.net  
February 2018

Wildfire Management: A Look at the Thomas Fire  
American Geosciences Institute  
May 2018

Engineering Tools for Wildland Fire Investigation: Fire Pattern Indicators to  
Power Line Ignition and Safety  
International Association of Arson Investigators  
May 2018

Wildland Fire Scene Origin & Cause Investigation Methodology  
International Association of Arson Investigators  
May 2018

Wildland Fire Scene Ignition Factors & Sources  
International Association of Arson Investigators  
May 2018

An Analysis of Powerline Causation Issues in the Wildland Fire Investigation  
Context  
International Association of Arson Investigators  
May 2018

Full Community Costs of Wildfire  
Southwest Fire Science  
September 2018

Burning Piles: Effects of Pile age, Moisture, Mass and Composition on Fire  
Effects, Consumption and Decomposition  
Forest Stewards Guild  
January 2019

Utah Chapter IAAI Annual Training Seminar  
Utah Chapter of the International Association of Arson Investigators  
February 2019

Smoke, Roads, and Safety  
RT-130 Wildland Fire Safety Training Annual Refresher (WFSTAR)  
National Wildfire Coordinating Group  
March 2019

2018 Wildfire Summary  
RT-130 Wildland Fire Safety Training Annual Refresher (WFSTAR)  
National Wildfire Coordinating Group  
April 2019

Wildfire Catastrophe Modeling  
ICCR  
April 2019

Watchout Situations  
RT-130 Wildland Fire Safety Training Annual Refresher (WFSTAR)  
National Wildfire Coordinating Group  
April 2019

LCES (Lookouts, Communications, Escape Routes, and Safety Zones)  
RT-130 Wildland Fire Safety Training Annual Refresher (WFSTAR)  
National Wildfire Coordinating Group  
April 2019

Standard Firefighting Orders  
RT-130 Wildland Fire Safety Training Annual Refresher (WFSTAR)  
National Wildfire Coordinating Group  
April 2019

Camp Fire Field Tour  
California Board of Forestry and Fire Protection  
August 2019

Fuel Explosions – An Overview of Natural Gas and Propane Systems and  
How They Are Related to Fire Causes  
Canadian Association of Fire Investigators  
September 2019

Charting Your Career Path in Fire Investigation  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Fire Flow Analysis  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Understanding Undetermined  
International Association of Arson Investigators and CFITrainer.net  
December 2019



Introduction to Youth-Set Fires  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Legal Aspects of Investigating Youth-Set Fires  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Motor Vehicles: The Engine and the Ignition, Electrical Systems, and Fuel  
Systems  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Motor Vehicles: Transmission, Exhaust, Brake and Accessory Systems  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Fire Investigation for Fire Officers  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Fundamentals of Interviewing  
International Association of Arson Investigators and CFITrainer.net  
December 2019

NFPA 1033 and Your Career  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Critical Evaluation and Testing of Commonly Reported Accidental Causes  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Residential Electrical Systems  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Residential Natural Gas Systems  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Fire Chemistry  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Principles of Fire Investigation Multi-Program  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Fire Investigation for Fire Officers Multi-Program with Concentration in  
Motor Vehicles  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Fire Investigation for Fire Officers Multi-Program with Concentration in  
Youth Set Fires  
International Association of Arson Investigators and CFITrainer.net  
December 2019

Barn Fires – Causes and Methods on Investigating  
Canadian Association of Fire Investigators  
December 2019

Wildfires  
National Center for Disaster Medicine and Public Health  
January 2020

Undetermined Cause is the Beginning, Not the End  
Envista Forensics  
January 2020

Discovery in Civil Cases  
International Association of Arson Investigators and CFITrainer.net  
January 2020

Investigating Natural Gas Systems  
International Association of Arson Investigators and CFITrainer.net  
January 2020

What the Insurance Professional Needs to Know About Fire Investigation  
International Association of Arson Investigators and CFITrainer.net  
January 2020

Discovery in Criminal Cases  
International Association of Arson Investigators and CFITrainer.net  
January 2020

The Deposition Part 1: Format, Content, and Preparation  
International Association of Arson Investigators and CFITrainer.net  
January 2020

The Deposition Part 2: Questioning Tactics and Effective Responses  
International Association of Arson Investigators and CFITrainer.net  
January 2020

NFPA 921 and 1033 2014 Editions: Important Revisions  
International Association of Arson Investigators and CFITrainer.net  
January 2020

Ethics and Social Media  
International Association of Arson Investigators and CFITrainer.net  
January 2020

Introduction to Appliances  
International Association of Arson Investigators and CFITrainer.net  
January 2020

Electrical Safety  
International Association of Arson Investigators and CFITrainer.net  
January 2020

North Bay Wildfires: Lessons from the Most Destructive Fires in California  
History  
International Public Safety Association  
January 2020

2019 Hot Topics Fall Webinar  
National Wildfire Coordinating Group  
February 2020

Fire Protection Systems  
International Association of Arson Investigators and CFITrainer.net  
March 2020

Evidence Examination: What Happens at the Lab?  
International Association of Arson Investigators and CFITrainer.net  
March 2020

DNA  
International Association of Arson Investigators and CFITrainer.net  
March 2020

Investigating Fire and Explosion Incidents Involving a Line-Of-Duty Death  
International Association of Arson Investigators and CFITrainer.net  
April 2020

Process of Elimination

International Association of Arson Investigators and CFITrainer.net  
April 2020

Ethical Duties Beyond the Fire Scene

International Association of Arson Investigators and CFITrainer.net  
April 2020

Charleston Sofa Super Store Fire

International Association of Arson Investigators and CFITrainer.net  
April 2020

Fundamentals of Residential Building Construction

International Association of Arson Investigators and CFITrainer.net  
April 2020

Arc Mapping Basics

International Association of Arson Investigators and CFITrainer.net  
April 2020

Managing Complex Fire Scene Investigations

International Association of Arson Investigators and CFITrainer.net  
April 2020

Investigating Fatal Fires

International Association of Arson Investigators and CFITrainer.net  
April 2020

Post-Flashover Fires

International Association of Arson Investigators and CFITrainer.net  
April 2020

The HAZWOPER Standard

International Association of Arson Investigators and CFITrainer.net  
April 2020

The Impact of Ventilation in Building Structures on Fire Development

International Association of Arson Investigators and CFITrainer.net  
April 2020

Understanding Fire Through the Candle Experiments

International Association of Arson Investigators and CFITrainer.net  
April 2020

Fire as a Weapon  
International Public Safety Association  
April 2020

Identifying Damage to Electrical Conductors  
Dane County Arson Response Initiative  
April 2020

Thermometry, Heat, and Heat Transfer  
International Association of Arson Investigators and CFITrainer.net  
April 2020

Preparation for the Marine Fire Scene  
International Association of Arson Investigators and CFITrainer.net  
April 2020

Receptacle Fires  
Dane County Arson Response Initiative  
April 2020

Wildfire Mitigation and Safety  
Pacific Power  
May 2020

Timeline Analysis  
Dane County Arson Response Initiative  
May 2020

Wildland Fire Investigations  
Dane County Arson Response Initiative  
May 2020

Fire Investigation Report Writing  
Dane County Arson Response Initiative  
May 2020

Thoughts on Living with Wildfire in Canada's Forests  
Institute for Catastrophic Loss Reduction  
May 2020

Lightning Detection and Forecasting  
Forest Technology Systems  
July 2020

Wildfire Management – Practices of Prudence  
Forest Technology Systems  
July 2020

Water Mapping in Residential Structures  
UL Firefighter Safety Research Institute  
July 2020

Using Handheld 3D Scanners for Crime and Crash Scenes  
Faro Technologies  
July 2020

Fire Investigator Legal Challenges  
California Conference of Arson Investigators  
August 2020

Wildfires in Siberia  
Pau Costa Foundation  
August 2020

Investigating Fires at Federal Correctional Institutions in Canada  
Canadian Association of Fire Investigators  
August 2020

Fire Investigation Report Writing – Public Sector  
Dane County Arson Response Initiative  
September 2020

Myths and Legends in Fire Investigation  
Dane County Arson Response Initiative  
October 2020

Fire Dynamics  
Dane County Arson Response Initiative  
November 2020

Fire Pattern Persistence  
Dane County Arson Response Initiative  
December 2020

Corrugated Stainless Steel Piping  
Dane County Arson Response Initiative  
December 2020

Introduction to Wildland Fuels  
Wildland Fire Learning Portal  
January 2021

Field Observer Fire Effects Monitor  
Wildland Fire Learning Portal  
January 2021

Wildland Fire Investigation  
California Conference of Arson Investigators  
January 2021

Interview Techniques – Interviewing 101  
Canadian Association of Fire Investigators  
February 2021

Digital Evidence  
Dane County Arson Response Initiative  
February 2021

Electric & Hybrid Vehicle Design Basics  
International Association of Arson Investigators and CFITrainer.net  
February 2021

Emerging Technologies in Fire Investigation  
International Association of Arson Investigators and CFITrainer.net  
February 2021

Dane County Arson Response Initiative  
Fire Scene Photography  
February 2021

Wildfire Investigation  
Firewise Consulting Learning Academy and Institute of Fire Engineers –  
Canada Branch  
February 2021

Preventing Occupational Carcinogens at the Fire Scene  
International Association of Arson Investigators and CFITrainer.net  
February 2021

Fire Investigator Health and Safety  
International Association of Arson Investigators and CFITrainer.net  
March 2021

Impacts of Horizontal Ventilation on Fire Behavior  
UL Firefighter Safety Research Institute  
March 2021

Vehicle Fires for Fire Investigators  
Dane County Arson Response Initiative  
April 2021

Electric & Hybrid Vehicle Fires  
International Association of Arson Investigators and CFITrainer.net  
April 2021

NFPA 921 2021ed. Updates/Changes  
Dane County Arson Response Initiative  
April 2021

Update on Electrical Vehicle Fires in Canada  
Canadian Association of Fire Investigators  
April 2021

Introduction to Aircraft Crash Investigations  
Canadian Association of Fire Investigators  
June 2021

Fire Dynamics 101 – Part 1  
Canadian Association of Fire Investigators  
June 2021

Fire Dynamics 101 – Part 2  
Canadian Association of Fire Investigators  
July 2021

Firewise USA – Risk Assessment  
National Fire Protection Association  
September 2021

Forensic Anthropology and Fire Investigations  
Dane County Arson Response Initiative  
September 2021

Hero to Zero – Firefighter Arsonists  
Dane County Arson Response Initiative  
September 2021



Fires in Buildings Under Construction  
Dane County Arson Response Initiative  
November 2021

Arson Profiling/Behavioral Analysis Unit  
Dane County Arson Response Initiative  
December 2021

Fire and Life Safety Systems  
Canadian Association of Fire Investigators  
December 2021

Alternative Fuel Vehicles  
International Association of Arson Investigators and CFITrainer.net  
April 2022

Community Risk Reduction  
Dane County Arson Response Initiative  
April 2022

Fatal Fire Investigations (Case Study)  
Canadian Association of Fire Investigators  
April 2022

Fire Origin Matrix  
Dane County Arson Response Initiative  
April 2022

Internet of Things  
Dane County Arson Response Initiative  
April 2022

Lithium-Ion Battery Fires  
International Association of Arson Investigators and CFITrainer.net  
April 2022

Photovoltaic Cells & Systems  
International Association of Arson Investigators and CFITrainer.net  
April 2022

Wildland Fires and Firesmart  
Canadian Association of Fire Investigators  
July 2022

Using K9's in Fire Investigation  
Canadian Association of Fire Investigators  
May 5, 2023

IFSC Wildland Fires Webinar Series – Introduction: Part I  
International Fire Safety Research Institute  
May 19, 2023

IFSC Wildland Fires Webinar Series – Introduction: Part II  
International Fire Safety Research Institute  
May 20, 2023

IFSC Wildland Fires Webinar Series – Fire Behavior Basics: Part I  
International Fire Safety Research Institute  
May 21, 2023

IFSC Wildland Fires Webinar Series – Fire Behavior Basics: Part II  
International Fire Safety Research Institute  
May 25, 2023

IFSC Wildland Fires Webinar Series – Fire Ecology Basics  
International Fire Safety Research Institute  
May 26, 2023

IFSC Wildland Fires Webinar Series – Fire Ecology Fundamentals  
International Fire Safety Research Institute  
May 26, 2023

IFSC Wildland Fires Webinar Series – Fire and Atmosphere Interactions  
International Fire Safety Research Institute  
May 26, 2023

IFSC Wildland Fires Webinar Series – Remote Sensing of Fires  
International Fire Safety Research Institute  
May 28, 2023

## **CONTINUING SAFETY EDUCATION**

Flammable Gases Seminar  
National Fire Protection Association  
November 1991

The Role of Warnings and Instructions  
College of Engineering, Department of Professional Engineering  
Development, University of Wisconsin  
March 1995

The Role of Hazard Analysis Techniques in Evaluating Product Safety  
College of Engineering, Department of Professional Engineering  
Development, University of Wisconsin  
April 1998

Hotel Fire Safety Act  
National Fire Protection Association  
Lodging Section Program  
November 1992

Underground Storage Tank Management - Conducting A Hydrological  
Investigation of Gasoline Tank Leakage  
Hazardous Materials and Environmental Management Conference  
March 1993

OSHA Respirator Protection Training  
Safety Unlimited, Inc.  
October 2017

A2 Respirator Basics  
ClickSafety  
October 2017

Hazardous Waste Operations and Emergency Response  
Environmental Trainers  
October 2017

Asbestos Awareness  
Environmental Trainers  
October 2017

## **CONTINUING SECURITY EDUCATION**

Conducting Security Surveys  
Milwaukee Area Technical College  
October 1980

Retail Security Workshop  
Milwaukee Area Technical College  
October 1980

Civil and Criminal Law Workshop  
Milwaukee Area Technical College  
February 1981

Legal Issues  
Milwaukee Area Technical College  
August 1984

## **CONTINUING EMERGENCY MANAGEMENT EDUCATION**

Department of Homeland Security, Washington, D.C.,  
Nationwide SAR Initiative

Suspicious Activity Reporting – Emergency Management Training

Department of Homeland Security, Washington, D.C., Federal Emergency  
Management Agency, Texas A & M Engineering Extension Service

MGT 312- Senior Officials Workshop for All-Hazards Preparedness

AWR-160-W WMD/Terrorism Awareness for Emergency Responders

Department of Homeland Security, Washington, D.C.  
Federal Emergency Management Agency/Office of Emergency  
Communications

Communications Unit Leader (COML)  
Kansas City, Kansas

Auxiliary Emergency Communicator (AUXCOMM)  
Waukesha, Wisconsin

Illinois Emergency Management Agency  
Springfield, Illinois

Leadership and Influence  
Chicago, Illinois

Principles of Emergency Management  
Bloomington-Normal, Illinois

Volunteer and Donations Management  
Wheaton, Illinois  
Effective Communications  
Lemont, Illinois

Emergency Planning  
Bloomington-Normal, Illinois

Homeland Security Exercise and Evaluation Program  
DeKalb, Illinois  
Tabletop Exercise Design  
Aurora, Illinois

International Association of Emergency Managers  
Falls Church, Virginia

2013 International Association of Emergency Managers Conference  
Reno, Nevada

2014 International Association of Emergency Managers Conference  
San Antonio, Texas

2015 International Association of Emergency Managers Conference  
Las Vegas, Nevada

2016 International Association of Emergency Managers Conference  
Savannah, Georgia

Illinois Emergency Services Management Association  
Evansville, Illinois

Hazard Identification and Risk Assessment (HIRA) / Threat and  
Hazard Identification and Risk Assessment (THIRA) Training

Special Needs Training – State of Illinois Standard Guide for  
Population Related Disaster Services  
2014 Illinois Emergency Services Management Association Training  
Conference  
Bloomington-Normal, Illinois

2015 Illinois Emergency Services Management Association Training  
Conference  
Springfield, Illinois

2016 Illinois Emergency Services Management Association Training  
Conference  
Springfield, Illinois

FEMA Emergency Management Institute, Washington, D.C  
ISP – Independent Study Program

IS-1	Emergency Manager: An Orientation to the Position
IS-3	Radiological Emergency Management
IS-5.a	An Introduction to Hazardous Materials
IS-7	A Citizen's Guide to Disaster Assistance
IS-15.b	Special Events Contingency Planning for Public Service Agencies
IS-22	Are You Ready? An In-Depth Guide to Citizen Preparedness
IS-29	Public Information Officer Awareness
IS-33.12	FEMA Initial Ethics Orientation 2012
IS-35.12	FEMA Safety Orientation 2012
IS-33.13	FEMA Initial Ethics Orientation 2013
IS-35.13	FEMA Safety Orientation 2013
IS-33.14	FEMA Initial Ethics Orientation 2014
IS-35.14	FEMA Safety Orientation 2014
IS-36	Multi-Hazard Planning for Child Care
IS-37	Managerial Safety and Health
IS-42	Social Media in Emergency Management
IS-55.a	Household Hazardous Materials – A Guide for Citizens

IS-100.b	Introduction to Incident Command System
IS-100.he	Introduction to Incident Command System for Higher Education for School
IS-100.leb	Introduction to the Incident Command System for Law Enforcement
IS-100.sca	Introduction to the Incident Command System for Schools and Colleges
IS-100.hcb	Introduction to the Incident Command System for Healthcare/Hospitals
IS-100.pwb	Introduction to the Incident Command System for Public Works
IS-101.c	Preparing for Federal Disaster Operations: FEMA
IS-102.c	Preparing for Federal Disaster Operations: FEMA Response Partners
IS-106.15	Workplace Violence Awareness Training
IS-120.a	An Introduction to Exercises
IS-130	Exercise Evaluation and Improvement Planning
IS-139	Exercise Design
IS-200.b	ICS for Single Resources and Initial Action Incidents
IS-201	Forms Used for the Development of the Incident Action Plan
IS-208.a	State Disaster Management
IS-212	Introduction to Unified Hazard Mitigation Assistance
IS-230.b	Fundamentals of Emergency Management
IS-230.d	Fundamentals of Emergency Management
IS-235.b	Emergency Planning

IS-240.a	Leadership & Influence
IS-240.b	Leadership & Influence
IS-241.a	Decision Making and Problem Solving
IS-241.b	Decision Making and Problem Solving
IS-242.a	Effective Communication
IS 242.b	Effective Communication
IS-265	Basic Instructional Skills
IS-271.a	Anticipating Hazardous Weather & Community Risk
IS-288	The Role of Voluntary Agencies in Emergency Management
IS-288.a	The Role of Voluntary Agencies in Emergency Management
IS-317	Introduction to Community Emergency Response Teams
IS-319	Tornado Mitigation Basics for Mitigation Staff
IS-322	Flood Mitigation Basics for Mitigation Staff
IS-328	Plan Review for Local Mitigation Plans
IS-340	Hazardous Materials Mitigation
IS-366	Planning for the Needs of Children in Disasters
IS-368	Including People with Disabilities and Others with Access and Functional Needs in Disaster Operations
IS-393.a	Introduction to Hazard Mitigation
IS-394.a	Protecting Your Home or Small Business from Disaster
IS-453	Introduction to Homeland Security Planning
IS-454	Fundamentals of Risk Management



IS-524	Continuity of Operations (COOP) Planner's Workshop
IS-545	Reconstitution Planning Course
IS-546.12	Continuity of Operations Awareness Course
IS-547.a	Introduction to Continuity of Operations
IS-551	Devolution Planning
IS-559	Local Damage Assessment
IS-613	Technical Writing
IS-619	Research in Training and Education
IS-632.a	Introduction to Debris Operations
IS-660	Introduction to Public-Private Partnerships
IS-700.a	National Incident Management System (NIMS:) An Introduction
IS-703.a	NIMS Resource Management
IS-704	NIMS Communications and Information Management
IS-775	EOC Management and Operations
IS-800.b	National Response Framework: An Introduction
IS-802	Emergency Support Function (ESF) #2 – Communications
IS-805	Emergency Management
IS-830	Introduction to NRF Annexes
IS-907	Active Shooter: What You Can Do
IS-909	Community Preparedness: Implementing Simple Activities for Everyone
IS-910	Emergency Management Preparedness Fundamentals

Emergency Management Magazine  
Folsom, California

2013 Emergency Management Summit  
Chicago, Illinois

2014 Emergency Management Summit  
Chicago, Illinois

2015 Emergency Management Summit  
Chicago, Illinois

College of DuPage Homeland Security Education Center  
Glen Ellyn, Illinois

London Riots and Bombing Response and Recovery Workshop

## **CONTINUING EMERGENCY COMMUNICATIONS EDUCATION**

Department of Homeland Security, Washington, D.C.  
Federal Emergency Management Agency/Office of Emergency  
Communications

E0969	NIMS ICS All-Hazards Communications Unit Leader (COML)
L0146	Homeland Security Exercise and Evaluation Program (HSEEP) Course

Department of Homeland Security, Washington, D.C.  
Office of Emergency Communications / Interoperable Communications  
Technical Assistance Program

Auxiliary Emergency Communications  
American Radio Relay League, Newington, CT  
CEP - Continuing Education Program

EC-001	Introduction to Emergency Communications
EC-002	Intermediate Emergency Communications
EC-003	Advanced Emergency Communications
EC-008	VHF/UHF – Life Beyond the Repeater

EC-015      Public Information Officer

EC-016      Public Service and Emergency Communications  
Management for Radio Amateurs

ARRL 1247   Digital Technology for Emergency Communications

## **CONTINUING SEVERE WEATHER MITIGATION EDUCATION**

National Weather Service, Romeoville, IL  
Severe Weather Spotter Training

eSpotter Introduction Training  
Severe Weather Spotter Training – Annually

National Science Foundation National Center for Atmospheric Research,  
Boulder, CO  
University Corporation for Atmospheric Research

Role of the SKYWARN Spotter  
SKYWARN Spotter Convective Basics

SKYWARN Spotter Training  
Anticipating Hazardous Weather & Community Risk

FEMA Emergency Management Institute, Washington, D.C.  
Independent Study Program

IS-319 Tornado Mitigation Basics for Mitigation Staff

DuPage County Office of Homeland Security and Emergency Management,  
Wheaton, IL  
Advanced Severe Weather Seminar

Advanced Severe Weather Seminar – Annually

Amateur Radio Relay League  
Newington, CT  
Hurricane Season Webinar

Hurricane Season Webinar - Annually

## INSTRUCTIONAL POSITIONS

Adler University  
Emergency Management Leadership Program  
Program Director/Professor

Adler School of Professional Psychology  
Police Psychology Program  
Professor

Quality Matters  
Maryland Online  
Peer Reviewer

American Radio Relay League  
Emergency Communications  
Certified Emergency Communications Field Instructor

American Radio Relay League  
Emergency Communications  
On-Line Instructional Mentor

American Radio Relay League  
Emergency Communications  
Certified Emergency Communications Field Examiner

State of Wisconsin  
Board of Vocational, Technical and Adult Education  
Fire Service Instructor I

State of Wisconsin  
Board of Vocational, Technical and Adult Education  
Fire Service Instructor II

William Rainey Harper College  
Fire Science  
Adjunct Instructor

Milwaukee Area Technical College  
Police Science Technology  
Adjunct Instructor

Milwaukee Area Technical College  
Fire Science Technology  
Adjunct Instructor

## CONTINUING INSTRUCTIONAL METHODOLOGY EDUCATION

Higher Learning Commission  
Continuing Education  
Workshop on Student Persistence and Completion

Higher Learning Commission  
Continuing Education  
Workshop on Assessment of Student Learning

State of Wisconsin  
Board of Vocational, Technical and Adult Education  
Instructional Methodology

Federal Emergency Management Agency  
Emergency Management Institute  
Basic Instructional Skills

Federal Emergency Management Agency  
Emergency Management Institute  
Research in Training and Education

American Radio Relay League  
Continuing Education Program  
Certified Emcomm Field Instructor

National Association of Fire Investigators  
National Certification Board  
Fire Investigation Instruction

Quality Matters Program  
Maryland Online  
Applying the Quality Matters Rubric Course

Quality Matters Program  
Maryland Online  
Peer Reviewer Course

Adler University  
Adler Online  
Online Technology and Pedagogy Training Course

Quality Matters Program  
Maryland Online  
2014 Quality Matters Rubric Update Course

Quality Matters Program  
Maryland Online  
Professional and Continuing Education Review Course

Quality Matters Program  
Maryland Online  
Master Reviewer Course

## **INSTRUCTIONAL POSITIONS – ENGAGEMENT SPECIFIC**

Fire/Arson Detection  
United States Fire Administration's National Fire Academy Field Program  
Chief Instructor  
October 1984

Fire/Arson Detection  
United States Fire Administration's National Fire Academy Field Program  
Chief Instructor  
March 1985

Arson Investigation  
Milwaukee Area Technical College  
Exclusive Instructor  
March 1986

Fire/Arson Detection  
United States Fire Administration's National Fire Academy Field Program  
Exclusive Instructor  
May 1986

5th Annual Midwest Conference – Fire Investigation Training Resources  
International Society of Fire Service Instructors  
Instructor  
September 1986

25th Annual Conference – Fire Investigation Training Resources  
Wisconsin Society of Fire Service Instructors  
Instructor  
February 1987

Arson Investigation  
Milwaukee Area Technical College  
Exclusive Instructor  
March 1987

Fire/Arson Detection  
United States Fire Administration's National Fire Academy Field Program  
Exclusive Instructor  
March 1987

Textiles for Interiors Course – Fire Safety Considerations in Interior Design  
Milwaukee Area Technical College  
Guest Instructor  
March 1987

Arson Investigation  
Milwaukee Area Technical College  
Exclusive Instructor  
March 1988

Arson Investigation  
Milwaukee Area Technical College  
Exclusive Instructor  
April 1988

Quarterly Training Seminar – Incendiary Fire Devices  
Wood County Fire Investigation Task Force  
Guest Instructor  
April 1988

Annual Training Seminar – Incendiary Fire Devices  
Marquette County Firemen's Association  
Guest Instructor  
April 1988

Regional Training Seminar – Firefighter's Role in Fire Investigation,  
Grand Rapids Fire Department  
Guest Instructor  
October 1988

Arson Investigation  
Milwaukee Area Technical College  
Exclusive Instructor  
March 1989

Arson Investigation  
Milwaukee Area Technical College  
Exclusive Instructor  
April 1989

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
August 1989

National Conference on Fire Investigation Instruction  
Primary Instructor  
National Association of Fire Investigators  
January 1990

Arson Investigation  
Milwaukee Area Technical College  
Exclusive Instructor  
March 1990

Fire Investigation Course for Professional Development  
Eastern Kentucky University  
Primary Instructor  
March 1990

Fire Investigation Training Seminar  
University of Southern Mississippi  
Primary Instructor  
June 1990

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
August 1990

Fire Litigation and Explosion Investigation Training Seminar  
HMR Fire Technology Institute  
Primary Instructor  
September 1990

1st Annual Fire and Explosion Investigation Training Program  
Sacramento County Fire Investigation Unit  
Primary Instructor  
November 1990

Fire Investigation Course for Professional Development  
Eastern Kentucky University  
Primary Instructor  
April 1991



National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
August 1991

Arson Investigation  
Milwaukee Area Technical College  
Exclusive Instructor  
February 1992

Fire Investigation Course for Professional Development  
Eastern Kentucky University  
Primary Instructor  
March 1992

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
August 1992

Public Defender's Conference – Fire Investigation  
State of Wisconsin Public Defender's Office  
Guest Instructor  
October 1992

Fire Science and Technology Educator's Section Program  
National Fire Protection Association  
Primary Instructor  
November 1992

FPETool and Hazard I User's Conference  
National Institute of Standards and Technology  
Guest Instructor  
October 1992

Fire Investigation Course for Professional Development  
Eastern Kentucky University  
Primary Instructor  
March 1993

Regional Training Program  
Northern Illinois Arson Task Force  
Guest Instructor  
April 1993

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
August 1993

Conference on Community College Fire Science and Technology Core  
Curriculum  
National Fire Protection Association  
Guest Instructor  
September 1993

Advanced Arson Investigation Seminar  
Denver Fire Department Arson Squad  
Guest Instructor  
March 1994

Fire Investigation Course for Professional Development  
Eastern Kentucky University  
Primary Instructor  
March 1994

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
August 1994

Rocky Mountain Fire, Arson, and Explosion Investigation Training Program  
Aurora Fire Department  
Primary Instructor  
January 1995

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
August 1995

Annual Training Seminar  
Washington State Chapter of the International Association of Arson  
Investigators  
Guest Instructor  
September 1995

Annual Training Seminar  
Colorado Association of Property and Evidence Technicians  
Guest Instructor  
September 1995

Fire Science and Technology Educator's Section Program  
National Fire Protection Association  
Primary Instructor  
November 1995

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 1995

National Advanced Fire, Arson, and Explosion Investigation Training  
Program  
Eastern Kentucky University  
Primary Instructor  
March 1996

National Advanced Fire, Arson, and Explosion Investigation Training  
Program  
Eastern Kentucky University  
Primary Instructor  
March 1997

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
July 1997

Texas Fire, Arson, and Explosion Investigation Training Symposium  
Missouri City Fire Department, Texas A & M University  
Primary Instructor  
September 1997

Annual Training Seminar  
Wisconsin Arson Insurance Council  
Guest Instructor  
November 1997

Annual Fire Investigation Training Program  
Burlington County, New Jersey Arson Task Force  
Guest Instructor  
January 1997

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
July 1998

Annual National Training Program  
Crawford Company Special Investigation Unit  
Primary Instructor  
August 1998

Texas Fire, Arson, and Explosion Investigation Training Symposium  
Missouri City Fire Department and Texas A & M University  
Primary Instructor  
August 1998

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
November 1998

National Seminar on Fire Analysis Litigation  
National Association of Arson Investigators  
Instructor  
January 1999

National Advanced Fire, Arson, and Explosion Investigation Training  
Program  
Eastern Kentucky University  
Primary Instructor  
April 1999

Florida Fire & Explosion Investigation Symposium  
National Association of Fire Investigators  
Primary Instructor  
July 1999

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
August 1999

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
November 1999

National Seminar on Fire Analysis Litigation  
National Association of Fire Investigators  
Instructor  
January 2000

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
November 2000

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Instructor  
August 2001

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2001

National Advanced Fire, Arson, and Explosion Investigation Training  
Program  
Eastern Kentucky University  
Instructor  
April 2002

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Instructor  
August 2002

National Seminar on Fire Analysis Litigation  
National Association of Fire Investigators  
Instructor  
January 2002

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
Instructor  
September 2002

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2002

National Fire, Arson, and Explosion Investigation Training Program  
Eastern Kentucky University  
Instructor  
August 2003

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
Instructor  
October 2003

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2003

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Instructor  
August 2004

National Advanced Fire, Arson, and Explosion Investigation Training  
Program  
National Association of Fire Investigators  
Instructor  
March 2004

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
Instructor  
September 2004

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2004

National Advanced Fire, Arson, and Explosion Investigation Training  
Program  
Eastern Kentucky University  
Instructor  
March 2005

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Instructor  
August 2005

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
Instructor  
September 2005

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Instructor  
October 2005

Motor Vehicle Fire Investigation – A Primer  
Elgin Regional Fire Academy  
Exclusive Instructor  
May 2006

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Instructor  
August 2006

Compartment Fire Dynamics and Advanced Fire Pattern Analysis – Origin  
Determination Utilizing Heat and Flame Vector Analysis  
Marengo, Illinois Fire Department  
Exclusive Instructor  
September 2006

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2006

National Advanced Fire, Arson, and Explosion Investigation Training  
Program  
Eastern Kentucky University  
Instructor  
March 2007

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Instructor  
August 2007

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
Instructor  
September 2007

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2007

Introduction to Emergency Communications  
American Radio Relay League  
Exclusive Instructor  
January 2008

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Instructor  
March 2008

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2008

Saudi Aramco Fire, Arson, and Explosion Investigation Training Program  
Trace Fire Safety Consultants  
Primary Instructor  
November 2008

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Instructor  
March 2009

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
Instructor  
September 2009

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2009



Introduction to Emergency Communications  
American Radio Relay League  
Exclusive Instructor  
January 2010

National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Instructor  
March 2010

Saudi Aramco Fire, Arson, and Explosion Investigation Training Program  
Trace Fire Safety Consultants  
Primary Instructor  
August 2010

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2010

Fire Investigation Training Program for the United States Consumer Product  
Safety Commission  
Eastern Kentucky University  
Primary Instructor  
December 2010

Central Zone Annual Training Conference  
Central Illinois Fire Investigators Association  
Guest Instructor  
April 2011

Vehicle Fire, Arson and Explosion Investigation Science and Technology  
Seminar  
National Association of Fire Investigators  
Instructor  
September 2011

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2011

Northern Zone Fire Investigation Seminar  
Illinois Chapter of the International Association of Arson Investigators  
Instructor  
January 2012

29<sup>th</sup> Annual Fire Investigation Training Conference  
Illinois Chapter of the International Association of Arson Investigators  
Instructor  
September 2012

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2012

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2013

Psychology of Leadership  
City of Chicago Police Academy  
January 2014

Introduction to the Incident Command System  
DuPage County Amateur Radio Emergency Service  
Primary Instructor  
January 2014

ICS for Single Resources and Initial Action Incidents  
DuPage County Amateur Radio Emergency Service  
Primary Instructor  
May 2014

Technical Standards and Safety Administration Fire Investigation Seminar  
Trace Fire & Safety  
Primary Instructor  
September 2014

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2014

National Incident Management System (NIMS): An Introduction  
DuPage County Amateur Radio Emergency Service  
Primary Instructor  
October 2014

National Response Framework (NRF): An Introduction  
DuPage County Amateur Radio Emergency Service  
Primary Instructor  
November 2014

Introduction to the Incident Command System  
DuPage County Amateur Radio Emergency Service  
Primary Instructor  
March 2015

Incident Command System for Single Incident and Initial Action  
DuPage County Amateur Radio Emergency Service  
Primary Instructor  
July 2015

Canadian National Fire, Arson, and Explosion Investigation Training Program  
National Association of Fire Investigators  
Primary Instructor  
October 2015

Motor Vehicle Fire Investigation – A Primer  
Elgin Fire Department  
Exclusive Instructor  
October 2017

Origin Determination/Introduction to Heat and Flame Vector Analysis  
Utah Chapter IAAI Annual Training Seminar  
Utah Chapter of the International Association of Arson Investigators  
February 2019

## **RECENT ACADEMIC PRESENTATIONS**

*Bringing Social Justice to Emergency Management Leadership*  
Adler University  
Chicago, Illinois

*Changing Landscape of Emergency Management*  
Adler University  
Chicago, Illinois  
*Emergency Management Leadership*  
Adler University  
Chicago, Illinois

*Bringing Social Justice to Emergency Management*  
Adler University  
Chicago, Illinois

*Emergency Management and the Role of Higher Education*  
Adler University  
Online Webinar

*Evolution of Emergency Management in a Global Society*  
Association of Threat Assessment Professionals  
Chicago, Illinois

*Impact/Interventions: Crises and Disasters for People with Disabilities*  
Adler University  
Chicago, Illinois

*Emergency Management Strategies: Crises and Disasters for People with Disabilities*  
Adler University  
Chicago, Illinois

*Strategic Planning: Goal Setting*  
Chicago Chapter - Association of Threat Assessment Professionals  
Chicago, Illinois

*Industrial Security and Emergency Management – A Necessary Partnership*  
Chicago Chapter – American Society for Industrial Security  
Chicago, Illinois

*Safeguarding the Psychological Well-Being and Mental Health of Your Personnel: Strategies and Interventions*  
Illinois Emergency Services Management Association  
Springfield, Illinois

*Safeguarding the Psychological Well-Being and Mental Health of Your Personnel: Strategies and Interventions*  
Hanover Park Township Emergency Services  
Bartlett, Illinois

## **PROFESSIONAL PAPERS, PUBLICATIONS AND ARTICLES**

*The Dispatcher*  
Badger Firemen's Association  
Previous Monthly Contributor

*The National Fire Investigator*

Journal of the National Association of Fire Investigators

Previous Editor and Regular Contributor

National Fire Code NFPA 907M, entitled *Manual for the Determination of Electrical Fire Causes*

National Fire Protection Association

Previous Committee Member

National Fire Code NFPA 921, 1992 Edition, entitled *Guide for Fire and Explosion Investigations*

National Fire Protection Association

Previous Committee Member

National Fire Code NFPA 921, 1995 Edition, entitled *Guide for Fire and Explosion Investigations*

National Fire Protection Association

Previous Committee Member

National Fire Code NFPA 921, 1998 Edition, entitled *Guide for Fire and Explosion Investigations*

National Fire Protection Association

Previous Committee Member

National Fire Code NFPA 921, 2014 Edition, entitled *Guide for Fire and Explosion Investigations*

National Fire Protection Association

Previous Committee Member

National Fire Code NFPA 921, 2017 Edition, entitled *Guide for Fire and Explosion Investigations*

National Fire Protection Association

Previous Committee Member

*Introduction to Fire Origin and Cause*, 3<sup>rd</sup> Edition

International Fire Service Training Association

Previous Committee Member

*Fire Investigator*, 2<sup>nd</sup> Edition

International Fire Service Training Association

Previous Committee Member

*Introduction to Fire Origin and Cause*, 4<sup>th</sup> Edition

International Fire Service Training Association

Previous Committee Member

*The Virtues of the Online/Face-to-Face Blend in Emergency Management  
Higher Education*  
Illinois Cops Magazine

*Experts: Emergency Management and Disaster Response Must Address  
Psychological Trauma and Mental Health*  
USA Today Homeland Security Special Edition

*Fire Investigator, 3rd Edition*  
International Fire Service Training Association  
Previous Committee Member

## **PROFESSIONAL PUBLICATIONS AND JOURNALS SUBSCRIPTIONS**

*The National Fire Investigator*  
Journal of the National Association of Fire Investigators (NAFI)

*The Fire and Arson Investigator*  
Publication of the International Association of Arson Investigators (IAAI)

*The NFPA Journal*  
Journal of the National Fire Protection Association (NFPA)

*Wildfire Magazine*  
International Association of Wildland Fire

## **PROFESSIONAL AWARDS/ACHIEVEMENTS**

**Certification of Appreciation for Valuable Contributions**  
Adler School of Professional Psychology

**John Charles Wilson Scholarship Award**  
International Association of Arson Investigators

**Firefighter of the Year**  
Ozaukee County Association of Fire Departments  
Common Council Official Resolution 86-19  
City of Cedarburg, Wisconsin

Honorable Mention for the Firefighter of the Year Award  
Badger Firemen's Association

Fire Safety Education Award  
Cedarburg Fire Department

Official Citation for Exemplary Service  
Cedarburg Police Department

Kentucky Colonel  
Governor Wallace G. Wilkinson  
Commonwealth of Kentucky

Man of the Year Award  
National Association of Fire Investigators

Material Review Committee Service Plaque  
Introduction to Fire Origin and Cause, 3<sup>rd</sup> Edition  
International Fire Service Training Association

Material Review Committee Service Plaque  
Fire Investigator, 2<sup>nd</sup> Edition  
International Fire Service Training Association

Material Review Committee Service Plaque  
Introduction to Fire Origin and Cause, 4<sup>th</sup> Edition  
International Fire Service Training Association

Instructional Service Award Plaque  
Central Illinois Fire Investigator's Association

Board of Director's Award  
Illinois Chapter of the International Association of Arson Investigators

Official Emergency Station (OES)  
American Radio Relay League  
Field Organization

Public Information Officer (PIO)  
American Radio Relay League  
Field Organization

## **PROFESSIONAL AFFILIATION COMMITTEE ASSIGNMENTS**

International Fire Service Training Association

Validation Committee for *Fire Investigator*

International Fire Service Training Association

Validation Committee for *Fire Origin and Cause*

National Fire Protection Association (NFPA)

Technical Committee on Fire Investigations

## **PROFESSIONAL AFFILIATIONS**

National Fire Protection Association (NFPA)

International Code Council (ICC)

American Society of Safety Engineers (ASSE)

American Society for Public Administration (ASPA)

National Fire Academy Alumni Association (NFAAA)

National Association of Fire Investigators (NAFI)

International Association of Arson Investigators (IAAI)

Illinois Chapter of International Association of Arson Investigators (IL-IAAI)

California Conference of Arson Investigators (CCAI)

Canadian Association of Fire Investigators (CAFI)

International Association of Wildland Fire (IAWF)

Society of Fire Protection Engineers (SFPE)

American Society of Safety Professionals (ASSP)

American Society for Testing and Materials (ASTM)



Society of Automotive Engineers (SAE)

American Radio Relay League (ARRL)

Honorable Order of the Kentucky Colonels

American Society of Mechanical Engineers

## **ACADEMIC AFFILIATIONS**

Phi Kappa Phi Honors Society

University of Cincinnati Alumni Association

Eastern Kentucky University Alumni Association

Eastern Kentucky University College of Justice & Safety Alumni Society

**Subject to Change Without Notice**

# **M.J. Schulz & Associates, Inc.**

## ***Forensic Fire and Explosion Incident Analysis***

### **Wadsworth Matter**

## **REPORT OF FORENSIC INVESTIGATION AND ANALYSIS**

**July 15, 2024**

### **Identification of the Subject Hostile Fire Incident**

The hostile fire incident that is the subject of this forensic investigation and analysis occurred on Tuesday, February 1, 2022, at or about 4:27 AM (0427), in a private residence located at 1620 Highway 374, Green River, Wyoming 82935.

### **Request for the Forensic Investigation and Analysis**

The request for this forensic investigation and analysis was originally received from Attorney Greyson Goody of the Goody Law Group whose law offices are located at 8605 Santa Monica Boulevard, Suite 90793, West Hollywood, California 90069. The law firm's business telephone number is (310) 893-1983 and its business facsimile number is (424) 427-6811. The law firm maintains a web presence at [www.goodylawgroup.com](http://www.goodylawgroup.com). Attorney Goody's electronic mail address is [greyson@goodylawgroup.com](mailto:greyson@goodylawgroup.com).

***915 Highland Pointe Drive, Suite 250 • Roseville, CA 95678***  
***Telephone: (800) 310-2891 • [www.mjschulz.com](http://www.mjschulz.com)***

The forensic investigation and analysis was subsequently referred to Attorney Rudwin Ayala of the law firm of Morgan & Morgan whose law offices are located at 1700 Palm Beach Lakes Boulevard, Suite 500, West Palm Beach, Florida 33401. The law firm's business telephone number is (561) 764-2220 and its business facsimile number is (561) 764-2270. The law firm maintains a web presence at [www.forthethepeople.com](http://www.forthethepeople.com). Attorney Ayala's electronic mail address is [rayala@forthepeople.com](mailto:rayala@forthepeople.com).

The request for this forensic investigation and analysis was received on behalf of M.J. Schulz & Associates, Inc. by me as the President and Principal of the firm. The request was received and accepted pursuant to the terms and conditions of the firm's current rate schedule that is attached to this report of forensic investigation and analysis as a supplement. As such, it should be considered a part hereof as if fully contained herein.

### **Client Representation**

Attorney Ayala and his law firm represent the interests of the plaintiffs in the civil litigation which ensued following the occurrence of the aforementioned hostile fire incident.

That civil litigation captioned STEPHANIE WADSWORTH, Individually and as Parent and Legal Guardian of W.W., K.W., G.W. and L.W., minor children, and MATTHEW WADSWORTH, Plaintiff, v. WALMART, INC. and JETSON ELECTRIC BIKES, LLC, Defendants is currently pending in the UNITED STATES DISTRICT COURT IN AND FOR THE DISTRICT OF WYOMING under Case No. 2:23-cv-00118-NDF JURY.

### **Authority of M.J. Schulz & Associates, Inc., and Michael Schulz to Conduct the Forensic Investigation and Analysis**

M.J. Schulz & Associates, Inc. is a registered corporation in the State of Illinois through its Secretary of State's Office.

Under the Illinois Revised Statutes, the State of Illinois requires that fire and explosion and analysts and their firms be properly licensed through the State of Illinois, Department of Financial and Professional Regulation. M. J. Schulz & Associates, Inc., an Illinois corporation, is a licensed Class 1 Private Detective Agency holding license number 117001067 issued by the State of Illinois, Department of Financial and Professional Regulation.

Michael J. Schulz is also personally licensed through the State of Illinois, Department of Financial and Professional Regulation. He is a registered Class A Private Detective holding license number 115001562 issued by the State of Illinois, Department of Financial and Professional Regulation.

Michael J. Schulz is also personally registered through the State of Illinois, Department of Professional Regulation as a permanent employee. He is a registered Permanent Employee holding permanent employee registration card number 129117390 issued by the State of Illinois, Department of Financial and Professional Regulation.

Under changes to the Texas Statutes, the State of Texas requires that experts be licensed through the Texas Department of Public Safety. M.J. Schulz & Associates, Inc. and Michael J. Schulz is a licensed Class A Investigation Company holding license number A10054.

Michael J. Schulz is also licensed through the State of Texas's Department of Public Safety. He is a licensed owner holding license number A10054.

### **Overview of the Professional Background of Michael Schulz**

Michael J. Schulz is an internationally known fire and explosion investigator and analyst and a fire and safety engineering technologist. During his forty-three-year career to date, he has conducted thousands of hostile fire and explosion incident investigations and analyses through actual incident scene inspections, evaluations of motor vehicles, riding lawn mowers, other equipment, and

physical evidence inspections and by conducting comprehensive reviews of reports, photographs, diagrams and other documentary materials and consulting with clients.

He has been a private consultant for over thirty-three years and has consulted on and conducted fire and explosion investigations and analyses on incidents that have occurred in the United States, Canada, Mexico, Puerto Rico, Saudi Arabi, and Europe.

He has previously served as a municipal law enforcement officer for over eleven years. In that capacity, he investigated fire and explosion incidents occurring both within his department's own jurisdiction, as well as other jurisdictions under established mutual aid agreements.

He has also served as a Captain with a municipal fire department for over nine years. In that capacity, he commanded the department's Fire Prevention Company and was responsible for the investigation of all fire and explosion incidents occurring within the department's jurisdiction, as well as other jurisdictions under established mutual aid agreements, supervising the department's fire code development efforts, supervising the department's inspection and enforcement activities, and implementing and directing the department's public fire safety education programs.

He also developed, founded, and earned accreditation for Adler University's Master of Arts (M.A.) in Emergency Management Leadership Program and served as the Program Director. Previous to that, he served as a professor in the institution's Master of Arts (M.A.) in Police Psychology Program where he instructed at the Chicago Police Department's training academy.

Michael J. Schulz holds a Master of Science degree (M.S.) in Safety, Security and Emergency Management from Eastern Kentucky University. He also holds a Bachelor of Science (B.S.) degree, Magna Cum Laude, in Fire and Safety Engineering Technology from the University of Cincinnati's OMI College of Applied Science. He also successfully completed the Certificate Program in Fire Science Technology taken at the University of Cincinnati's OMI College of Applied Science and co-sponsored by the United States Fire Administration's National Fire

Academy.

Michael J. Schulz is a graduate of the United States Fire Administration's National Fire Academy (NFA) in Emmitsburg, Maryland, where he completed the Fire and Arson Investigation residency program.

He also successfully attained Certificates of Completion from the CFITrainer.net in Principals of Fire Investigation, Fire Investigation for Fire Officers with a concentration in Youth-Set Fires and Fire Investigation for Fire Officers with a concentration in Motor Vehicle Fires.

Michael J. Schulz was a charter member of the National Fire Protection Association's (NFPA) Technical Committee on Fire Investigations having been appointed to the committee at the time of its formation by the National Fire Protection Association's Standards Council. During his seventeen (17) year tenure as a member of the technical committee, he made significant contributions to both the National Fire Code 907M, entitled Manual for the Determination of Electrical Fire Causes, and the National Fire Code 921, entitled Guide for Fire and Explosion Investigations.

Michael J. Schulz was also a member of the International Fire Service Training Association (IFSTA) Fire Origin and Cause Material Review Committee. The Material Review Committee is responsible for the continuing review and revision of the 2<sup>nd</sup> Edition of the Association's publication, entitled, Fire Origin and Cause.

Michael J. Schulz was also a member of the International Fire Service Training Association (IFSTA) Fire Investigator Material Review Committee. The Material Review committee is responsible for the continuing review and revision of the 1<sup>st</sup> Edition of the Association's publication, entitled, Fire Investigator.

He was also a member of the International Fire Service Training Association (IFSTA) Fire

Investigator Material Review Committee. The Material Review committee is responsible for the continuing review and revision of the 2nd Edition of the Association's publication, entitled, Fire Investigator.

He was most recently a member of the International Fire Service Training Association (IFSTA) Fire Investigator Material Review Committee. The Material Review committee is responsible for the continuing review and revision of the 3rd Edition of the Association's publication, entitled, Fire Investigator.

Michael J. Schulz has also served as a consultant to the federal government, including the Federal Emergency Management Agency's, United States Fire Administration's National Fire Academy, state governments and local government. Recently, he was retained by the State of Illinois Attorney General's Office and the State of Illinois Office of the State Fire Marshal to consult with their respective offices relative to civil litigation in which they were representing a government employed defendant.

He was selected to provide professional fire and explosion investigation and analysis training to the U.S. Consumer Product Safety Commission's field investigation staff members.

He was also selected by the Ontario Technical Standards and Safety Administration to provide professional fire and explosion investigation and analysis training to their field personnel.

He is often asked to present and to provide professional fire and explosion investigation and analysis training to regional organizations comprised of current and prospective practitioners in the field of fire and explosion investigation and analysis and allied areas of study.

Michael J. Schulz has also served as a consultant to a foreign government, namely, Saudi Arabia. In past several years, he has been selected to provide professional fire and explosion investigation and analysis training to that government's Saudi Aramco Oil Company.

Michael J. Schulz holds national registration as a National Board Certified Fire and Explosion Investigator (CFEI), a National Board Certified Vehicle Fire Investigator (CVFI), and a National Board Certified Fire Investigation Instructor (CFII) through the National Association of Fire Investigators' National Certification Board. He also holds international registration as a Certified Canadian Fire Investigator (CCFI) through the Canadian Association of Fire Investigators' National Certification Committee. He also holds national registration as a Certified Fire Protection Specialist (CFPS) through the National Fire Protection Association and the Certified Fire Protection Specialist Board.

He is often solicited to consult with and to provide professional and skilled technical assistance to other practitioners in the fire and explosion investigation and analysis field.

A complete listing of the professional education, training and background of Michael Schulz is included in the current edition of his Curriculum Vitae, which is attached to this report of investigation and analysis and should be considered a part hereof as if fully contained herein.

### **Nature of this Report of the Forensic Investigation and Analysis**

This is a report of the forensic investigation and analysis of the hostile fire incident as of the date of its issuance. This report was prepared to provide an overview and summary of the investigative activities and analyses undertaken during the course of the forensic investigation and analysis and to list the significant findings and conclusions reached as a result of same. Those investigative activities and associated analyses were all conducted in deference to the generally recognized and accepted practices and methodologies of the fire and explosion investigation and analysis profession detailed herein.

This comprehensive summary, then, was not intended to enumerate and specifically describe in detail each and every individual fact or observation upon which my findings and conclusions were based. However, each finding and conclusion listed herein is based upon the data and information



gleaned and analyzed during the investigation and analysis; the conducting of applicable research; and the culmination of my professional knowledge, training, and experience during my forty-three-year career.

Unless otherwise stated, each of my findings and conclusions listed herein was reached and is expressed with a reasonable degree of certainty within the field of fire and explosion investigation and analysis.

### **Goals of the Forensic Fire Investigation and Analysis**

The goals of any forensic fire investigation and analysis are generally three-fold: to accurately evaluate the origin of the hostile fire incident; to accurately evaluate the ignition sequence (cause) of the hostile fire incident; and to accurately evaluate the responsibility for the occurrence of the hostile fire incident and its adverse and undesired consequences including both personal injury and property damage.

Fire and explosion investigation and analysis is an integral part of the fire protection system. Properly conducted and reported fire and explosion investigations and analyses provide the fire protection community, and those disciplines that closely interact with it and rely upon the results, with valuable data, information and insight that ultimately leads to the reduction of physical injuries and property damage as a result of the occurrence of hostile fire incidents.

Like all forensic fire investigations and analyses, it was the goal of this investigation and analysis of this hostile fire incident to accurately evaluate and report the origin of the hostile fire incident; to accurately evaluate and report the ignition sequence (cause) of the hostile fire incident; and to accurately evaluate and report the responsibility for the occurrence of the hostile fire incident. More specifically, it was the overall goal of the investigation and analysis to prevent the same or similar type of hostile fire incident from occurring again in the future, thereby preventing future physical injuries and property damage from a similar set of facts and circumstances.

Forensic fire and explosion investigation and analysis is recognized as an important component of the fire prevention community and serves as a basis for relevant data and information for that community.

### **Applicable Guides, Recommended Practices Codes and Standards**

During any forensic fire investigation and analysis, both general and specific guides, recommended practices, codes and standards can become applicable to the investigative activities and analyses undertaken. Likewise, during this forensic fire investigation and analysis, the following applicable guides, recommended practices, codes and standards were identified:

- National Fire Protection Association's National Fire Code NFPA 921, entitled *Guide for Fire and Explosion Investigations*.
- National Fire Protection Association's National Fire Code NFPA 1033, entitled, *Professional Qualifications for Fire Investigators*.
- National Fire Protection Association's National Fire Code NFPA 1730, entitled, *Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations*.
- American Society for Testing and Materials' Standard E 860, entitled *Standard Practice for Examining and Testing Items That Are or May Become Involved in Litigation*.
- American Society for Testing and Materials' Standard E 1188, entitled *Standard Practice for the Collection and Preservation of Information and Physical Items by a Technical Investigator*.
- American Society for Testing and Materials' Standard E 1459, entitled, *Standard Guide for Physical Evidence Labeling and Related Documentation*.
- American Society for Testing and Materials' Standard E 1492, entitled, *Standard Practice for Receiving, Documenting, Storing, and Retrieving Evidence in a Forensic Science Laboratory*.

## **Definitions of Specific Terminology**

Certain specific terminology, that may be unique to the field of fire and explosion investigation and analysis, and which are central to this narrative, may be utilized and/or addressed within this report of investigation and analysis. Certain other terminology is defined within the specific discussions contained herein that they most closely relate to. Other terminology or concepts that are utilized and/or addressed, that may not be specifically defined here, should be considered to have their commonly accepted meanings within the context of this report of forensic investigation and analysis. They include the following:

- ***Area of Origin*** - a structure, part of a structure, or general geographic location with a fire scene, in which the “point of origin” of a fire or explosion is reasonably believed to be located. (NFPA 921, 3.3.13)
- ***Cause*** - the circumstances, conditions, or agencies that brought about or resulted in the fire or explosion incident, damage to property, bodily injury or loss of life. NFPA 921, 3.3.27)
- ***Ceiling Jet*** - a relatively thin layer of flowing hot gases that develops under a horizontal surface (e.g., ceiling) as a result of plume impingement and the following gas being forced to move horizontally. (NFPA 921, 3.3.28)
- ***Combustion*** - a chemical process of oxidation that occurs at a rate fast enough to produce heat and usually light in the form of either a glow or flame. (NFPA 921, 3.3.35)
- ***Combustion Products*** - the heat, gases, volatilized liquids and solids, particulate matter, and ash generated by combustion. (NFPA 921, 3.3.36)
- ***Conduction*** - heat transfer to another body or within a body by direct contact. (NFPA 921, 3.3.38)
- ***Convection*** - heat transfer by circulation within a medium such as a gas or a liquid. (NFPA 921, 3.3.39)
- ***Entrainment*** - the process of air or gases being drawn into a fire, plume or jet. (NFPA 921, 3.3.56)

- **Explosion** - the sudden conversion of potential energy (chemical or mechanical) into kinetic energy with the production and release of gases under pressure, or the release of gas under pressure. These high-pressure gases then do mechanical work such as moving, changing, or shattering nearby materials. (NFPA 921, 3.3.58)
- **Explosion Dynamics** - study of how chemistry, physics, fire science, engineering disciplines of fluid and solid mechanics, and heat transfer interact to influence explosion behavior. (NFPA 921, 3.3.59)
- **Fire** - a rapid oxidation process, which is an exothermic chemical reaction, resulting in the evolution of light and heat in varying intensities. (NFPA 921, 3.3.68)
- **Fire Analysis** - the process of determining the origin, cause, development, responsibility, and, when required, a failure analysis of a fire or explosion. (NFPA 921, 3.3.69)
- **Fire Cause** - the circumstances, conditions, or agencies that bring together a fuel, ignition source, and oxidizer (such as air or oxygen) resulting in a fire or a combustion explosion. (NFPA 921, 3.3.71)
- **Fire Dynamics** - the detailed study of how chemistry, fire science, and the engineering disciplines of fluid mechanics and heat transfer interact to influence fire behavior. (NFPA 921, 3.3.73)
- **Fire Effects** - the observable or measurable change in or on a material as a result of a fire. (NFPA 921, 3.3.74)
- **Fire Hazard** - any situation, process, material or condition that can cause a fire or explosion or that can provide a ready fuel supply to augment the spread or intensity of a fire or explosion, all of which pose a threat to life or property. (NFPA 921, 3.3.75)
- **Fire Investigation** - the process of determining the origin, cause, and development of a fire or explosion. (NFPA 921, 3.3.76)
- **Fire Patterns** - the visible or measurable physical changes, or identifiable shapes, formed by a fire effect or group of fire effects. (NFPA 921, 3.3.78)

- **Fire Science** - the body of knowledge concerning the study of fire and related subjects (such as combustion, flame, products of combustion, heat release, heat transfer, fire and explosion chemistry, fire and explosion dynamics, thermodynamics, kinetics, fluid mechanics, fire safety) and their interaction with people, structures, and the environment. (NFPA 921, 3.3.81)
- **Fire Spread** - the movement of fire from one place to another. (NFPA 921, 3.3.82)
- **First Fuel Ignited** - the first fuel ignited is that which first sustains combustion beyond the ignition source. (NFPA 921, 3.3.83)
- **Flame** - a body or stream of gaseous material involved in the combustion process and emitting radiant energy at specific wavelength bands determined by the combustion chemistry of the fuel. In most cases, some portion of the emitted radiant energy is visible to the human eye. (NFPA 921, 3.3.84)
- **Flame Front** - the flaming leading edge of a propagating combustion reaction zone. (NFPA 921, 3.3.85)
- **Flash Fire** - a fire that spreads by means of a flame front rapidly through a diffuse fuel, such as dust, gas, or the vapors of an ignitable liquid, without the production of damaging pressure. (NFPA 921, 3.3.91)
- **Flammable Range** – the range of concentrations between the lower and upper flammable limits. (NFPA 921, 3.3.90)
- **Flashover** - a transition phase in the development of a compartment fire in which surfaces exposed to thermal radiation reach ignition temperature more or less simultaneously and, given sufficient availability of oxygen, fire spreads rapidly throughout the space, resulting in full room involvement or total involvement of the compartment or enclosed space. (NFPA 921, 3.3.93)
- **Fuel** - a material that will maintain combustion under specified environmental conditions. (NFPA 921, 3.3.95)

- **Fuel Gas** - natural gas, manufactured gas, LP-gas, and similar gases commonly used for commercial or residential purposes such as heating, cooling, or cooking. (NFPA 921, 3.3.96)
- **Fuel Load** - the total quantity of combustible contents of a building, space, or fire area, including interior finish and trim, expressed in heat units or the equivalent weight in wood. (NFPA 921, 3.3.97)
- **Fuel-Controlled Fire** - a fire in which the heat release rate and growth are controlled by the characteristics of the fuel, such as quantity and geometry, and in which adequate air for combustion is available. (NFPA 921, 3.3.98)
- **Fuel Room Involvement** - condition in a compartment fire in which the entire volume is involved in combustion of varying intensities. (NFPA 921, 3.3.99)
- **Glowing Combustion** - luminous burning of solid material without a visible flame. (NFPA 921, 3.3.101)
- **Heat** - a form of energy characterized by vibration of molecules and capable of initiating and supporting chemical changes and changes of state. (NFPA 921, 3.3.106)
- **Heat and Flame Vector** - an arrow used in a fire scene drawing to show the direction of heat, smoke, or flame flow. (NFPA 921, 3.3.107)
- **Heat Flux** - the measure of the rate of heat transfer to a surface or an area, typically represented in kW/m<sup>2</sup>, or W/cm<sup>2</sup>. (NFPA 921, 3.3.108)
- **Heat of Ignition** - the heat energy that brings about ignition. (NFPA 921, 3.3.109)
- **Heat Release Rate (HRR)**- the rate at which heat energy is generated by burning. (NFPA 921, 3.3.110)
- **Heat Transfer** - the exchange of thermal energy between materials through conduction, convection, and/or radiation. (NFPA 921, 3.3.111)

- **High-Order Damage** - a rapid pressure rise or high-force explosion characterized by a shattering effect on the confining structure or container and long missile distances. (NFPA 921, 3.3.113)
- **Ignitable Liquid** - any combustible or flammable liquid. (NFPA 921, 3.3.116)
- **Ignition** - the process of initiating self-sustained combustion. (NFPA 921, 3.3.117)
- **Ignition Energy** - the quantity of heat energy that should be absorbed by a substance to ignite and burn. (NFPA 921, 3.3.118)
- **Ignition Temperature** - minimum temperature a substance should attain in order to ignite under specific test conditions. (NFPA 921, 3.3.119)
- **Low-Order Damage** - a slow rate of pressure rise or low-force explosion characterized by a pushing or dislodging effect on the confining structure or container and by short missile distances. (NFPA 921, 3.3.132)
- **Material First Ignited** - the fuel that is set on fire by heat of ignition; to be meaningful, both a type of material and a form of material should be identified. (NFPA 921, 3.3.133)
- **Origin** - the general location where a fire or explosion began. (NFPA 921, 3.3.140)
- **Plume** - the column of hot gases, flames, and smoke rising above a fire; also called convection column, thermal updraft or thermal column. (NFPA 921, 3.3.148)
- **Point of Origin** - the exact physical location within the area of origin where a heat source, a fuel, and an oxidizing agent first interact, resulting in a fire or explosion. (NFPA 921, 3.3.149)
- **Pyrolysis** - a process in which material is decomposed, or broken down, into simpler molecular compounds by the effects of heat alone; pyrolysis often precedes combustion. (NFPA 921, 3.3.157)
- **Radiation** - heat transfer by way of electromagnetic waves that are longer than visible light waves and shorter than radio waves. (NFPA 921, 3.3.161)

- **Responsibility** - the accountability of a person or other entity for the event or sequence of events that caused the fire or explosion spread of fire, bodily injuries, loss of life, or property damage. (NFPA 921, 3.3.163)
- **Risk** – the degree of peril; the possible harm that might occur that is represented by the statistical probability or quantitative estimate of the frequency or severity of injury or loss. (NFPA 921, 3.3.164)
- **Scientific Method** - the systematic pursuit of knowledge involving the recognition and definition of a problem; the collection of data through observation and experimentation; analysis of the data; the formulation, evaluation and testing of hypotheses; and, where possible, the selection of a final hypothesis. (NFPA 921, 3.3.167)
- **Self-Heating** - the result of exothermic reactions, occurring spontaneously in some materials under certain conditions, whereby heat is generated at a rate sufficient to raise the temperature of the material. (NFPA 921, 3.3.171)
- **Self-Ignition** - ignition resulting from self-heating, synonymous with spontaneous ignition. (NFPA 921, 3.3.172)
- **Self-Ignition Temperature** - the minimum temperature at which the self-heating properties of a material lead to ignition. (NFPA 921, 3.3.173)
- **Smoke** - the airborne solid and liquid particulates and gases evolved when a material undergoes pyrolysis or combustion, together with the quantity of air that is entrained or otherwise mixed in the mass. (NFPA 921, 3.3.181)
- **Smoke Condensate** - the condensed residue of suspended vapors and liquid products of combustion. (NFPA 921, 3.3.178)
- **Smoldering** - combustion without flame, usually with incandescence and smoke. (NFPA 921, 3.3.180)
- **Soot** - black particles of carbon produced in the flame. (NFPA 921, 3.3.173)



- ***Spoliation*** - loss, destruction, or material alteration of an object or document that is physical evidence in a legal proceeding by one who has responsibility for its preservation. (NFPA 921, 3.3.186)
- ***Spontaneous Heating*** - process whereby a material increases in temperature without drawing heat from its surroundings. (NFPA 921, 3.3.187)
- ***Spontaneous Ignition*** - initiation of combustion of a material by an internal chemical or biological reaction that has produced sufficient heat to ignite the material. (NFPA 921, 3.3.188)
- ***Temperature*** - the degree of sensible heat of a body as measured by a thermometer or similar instrument. (NFPA 921, 3.3.191)
- ***Thermal Inertia*** - the properties of a material that characterize its rate of surface temperature rise when exposed to heat; related to the product of the material's thermal conductivity ( $k$ ), its density ( $\rho$ ) and its heat capacity ( $c$ ). (NFPA 921, 3.3.194)
- ***Thermodynamics*** - the branch of physics that deals with the relationship between heat and other forms of energy. (NFPA 921, 3.3.195)
- ***Ventilation*** – the movement of gases within, into, or from any compartment or space or the firefighting operation of removing smoke and heat from the structure by opening windows and doors or making holes in the roof. (NFPA 921, 3.3.206)
- ***Ventilation-Controlled Fire*** - a fire in which the heat release rate or growth is controlled by the amount of air available to the fire. (NFPA 921, 3.3.207)

### **Methodology of the Forensic Investigation and Analysis**

The forensic investigation and analysis of any hostile fire and explosion incident is a complex investigative and scientific endeavor. The methodology of such an endeavor, therefore, must include the comprehensive, objective, and accurate compilation, interpretation, and evaluation of all the available and relevant data. This forensic investigation and analysis was conducted with those concepts at the forefront and through adherence with the following:

- Specific compliance with the Scientific Method.
- Specific compliance with the intellectual standards of critical thinking.
- Specific compliance with the process of analyzing competing hypotheses.
- Specific compliance with the guidelines of the National Fire Code NFPA 921 promulgated by the National Fire Protection Association (NFPA).
- Specific compliance with the guidelines of the National Fire Code NFPA 1033 promulgated by the National Fire Protection Association (NFPA).
- Specific deference to the requirements of Section 1.3.7 through 1.3.8, inclusive of the appropriate edition of National Fire Code NFPA 1033 promulgated by the National Fire Protection Association (NFPA).
- Specific compliance with the guidelines of the National Fire Code NFPA 1730 promulgated by the National Fire Protection Association (NFPA).
- Specific compliance with National Wildfire Coordinating Groups' PMS 412/NFES 1874 publication entitled, Guide to Wildfire Origin and Cause Determination.
- Specific compliance with National Wildfire Coordinating Groups' PMS 461/NFES 001077 publication entitled, Incident Response Pocket Guide.

### **Specific Compliance with the Scientific Method**

During the course of this forensic investigation and analysis, I was careful to employ the scientific method which is a systematic approach commonly utilized in all of the physical sciences. Its application and use facilitated the comprehensive, objective, and accurate compilation, interpretation, and evaluation of all relevant data.

The scientific method as applied during a fire and explosion investigation and analysis consists of six (6) steps including the following:

- The recognition of the need for the investigation and analysis.
- The definition of the problem wherein the methodology of the investigation and analysis is formulated.
- The collection of the relevant data concerning the incident being investigated and analyzed.
- The analysis of the relevant data collected concerning the incident being investigated and analyzed.
- The development of a hypothesis based upon the analysis of the relevant data collected concerning the incident being investigated and analyzed. This is often referred to as inductive reasoning.

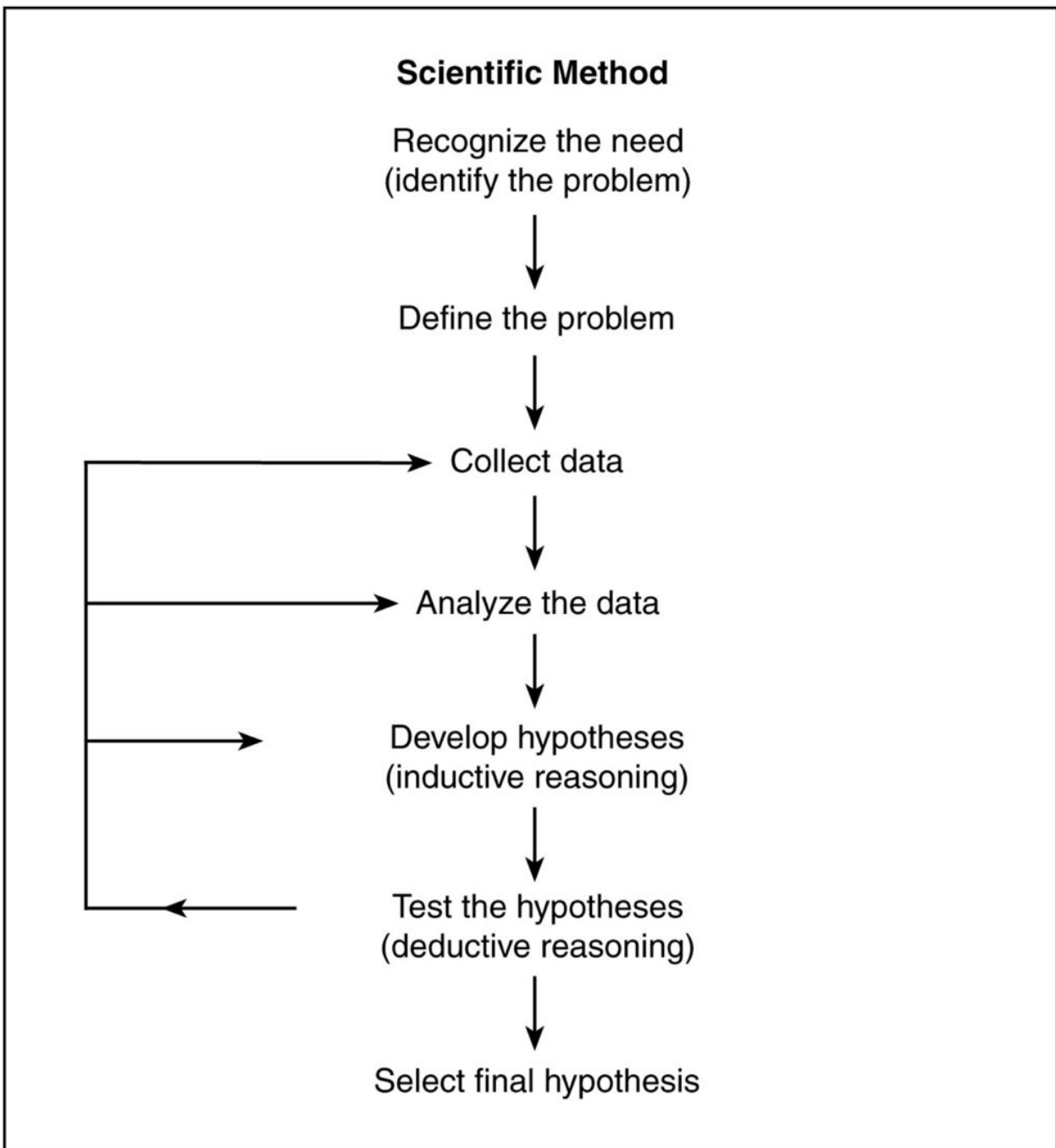
**Note:** *Inductive reasoning is a psychological process used to make decisions and solve problems. In applying inductive reasoning, one draws conclusions by going from the specific to the general.*

- The testing of the hypothesis formulated. This is often referred to as deductive reasoning.

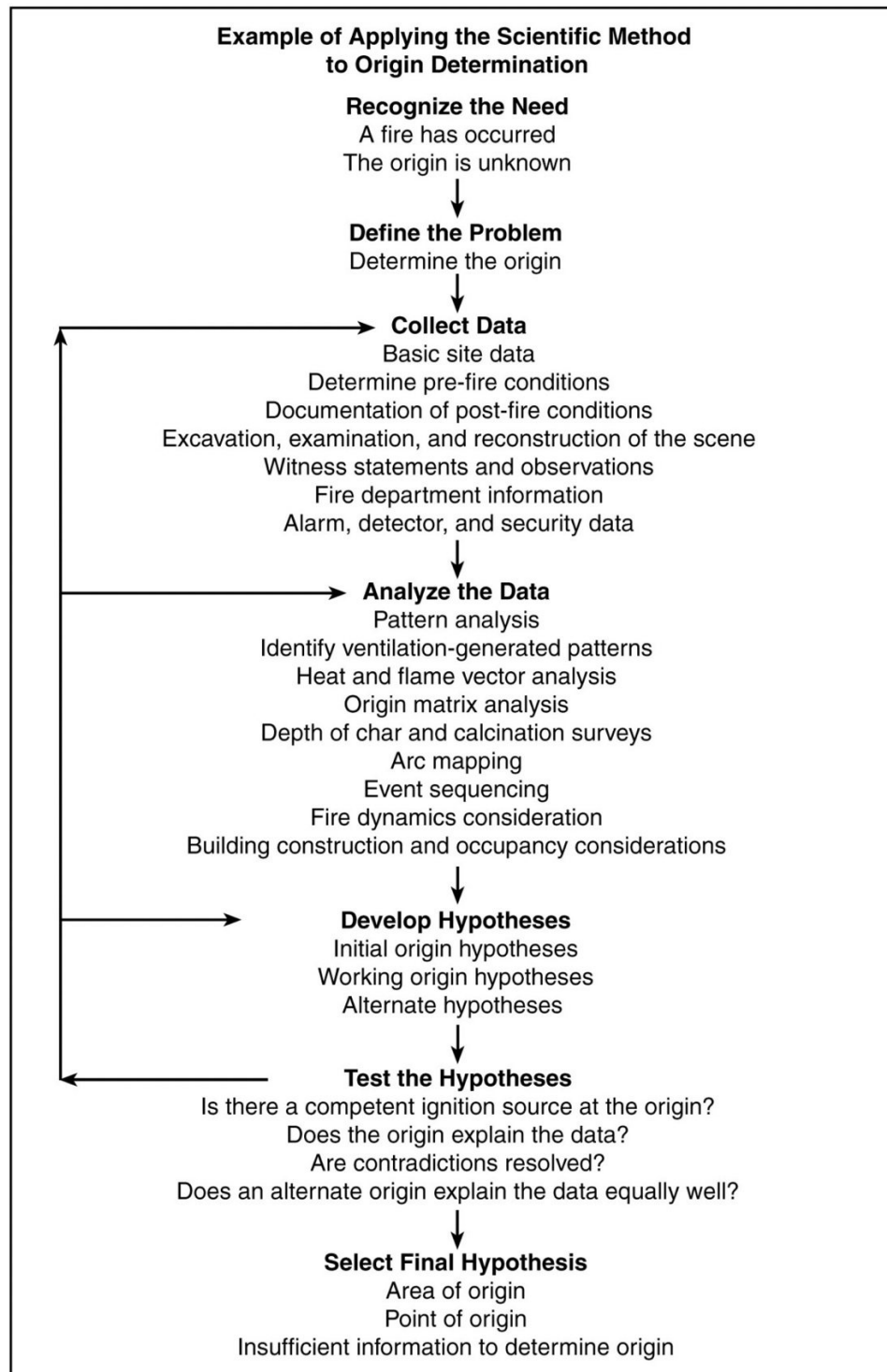
**Note:** *Deductive reasoning is another psychological process used to make decisions and solve problems. In applying deductive reasoning, one uses general ideas or premises to come to a specific conclusion.*

It should be noted that the National Fire Protection Association's National Fire Code NFPA 921, entitled *Guide for Fire and Explosion Investigations*, first introduced an additional and seventh step to the traditional six steps of the scientific method. That seventh step is:

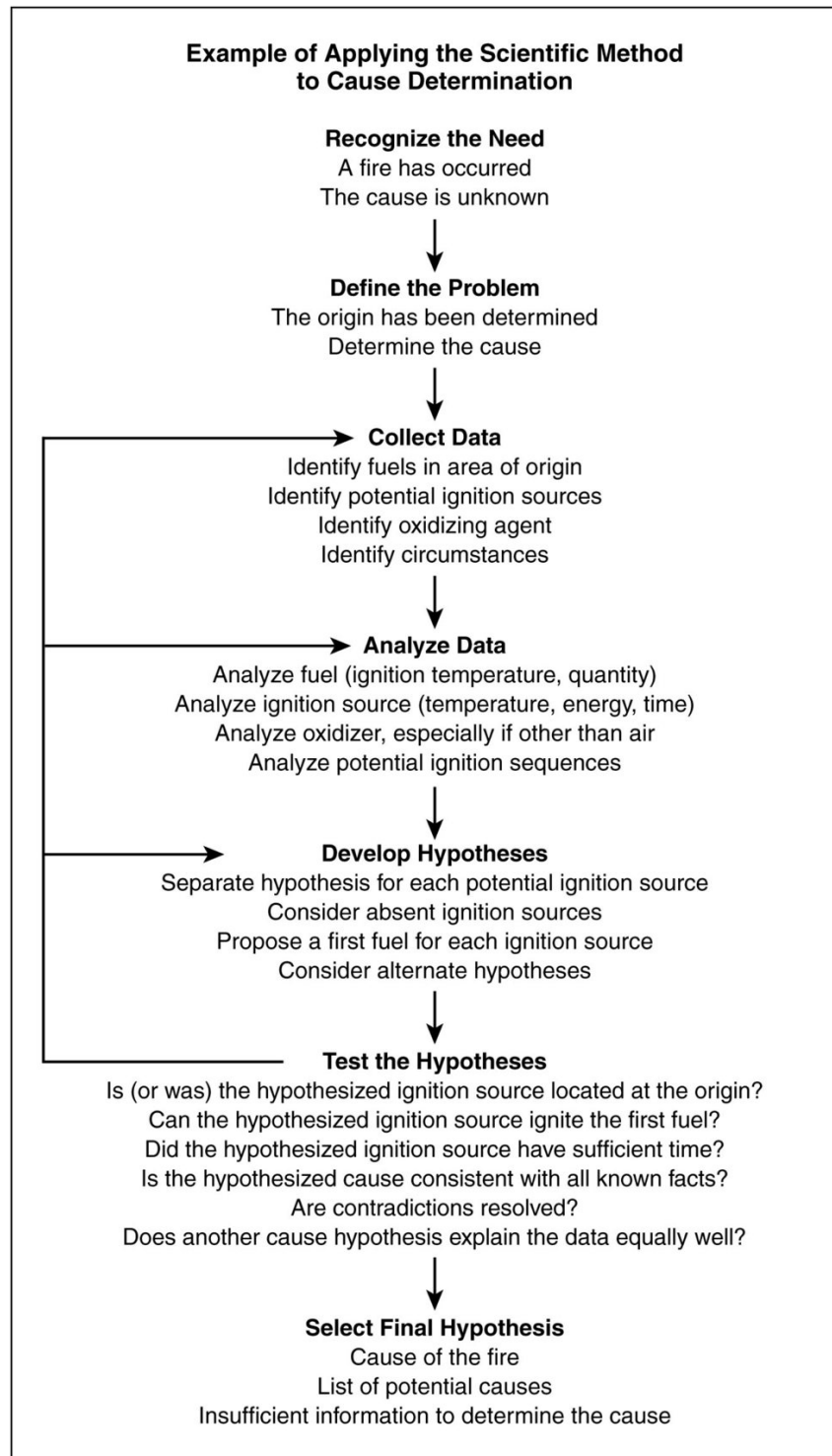
- Selection of the final hypothesis.



**Figure:** *NFPA 921 Figure 4.3 Use of the Scientific Method.*



**Figure - NFPA 921 Figure 18.2 An Example of Applying the Scientific Method to Origin Determination.**



**Figure - NFPA 921 Figure 19.2 An Example of Applying the Scientific Method to Fire Cause Determination.**

The application and use of the scientific method also insured that the investigation and analysis was conducted according to the recognized and accepted standards and practices of the fire and explosion investigation and analysis profession, as those standards and practices are documented in the following:

- National Fire Protection Association's National Fire Code NFPA 921, entitled *Guide for Fire and Explosion Investigations*.
- National Fire Protection Association's National Fire Code NFPA 1033, entitled, *Professional Qualifications for Fire Investigators*.
- National Fire Protection Association's National Fire Code NFPA 1730, entitled, *Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations*.

In addition to the aforementioned, the recognized and accepted scientific principles and underlying science for the aforementioned standards and practices of the fire and explosion investigation and analysis profession are documented in the following:

- Federal Emergency Management Agency, United States Fire Administration's Publication Number FA 178, entitled, *Report of the United States Fire Administration Program for the Study of Fire Patterns*.
- National Institute of Justice's Research Report 601-97, entitled, *Report on Full Scale Room Burn Pattern Study*.
- National Fire Protection Association's publication, entitled, *Fire Protection Handbook*.
- Society of Fire Protection Engineers' publication, entitled, *Fire Protection Engineering Handbook*.
- Fire Science Publishers and the Society of Fire Protection Engineers' publication, entitled, *"Ignition Handbook."*

- International Fire Service Training Association's publication, entitled, *Fire Origin and Cause*.
- International Fire Service Training Association's publication, entitled, *Fire Investigator*.
- United States Department of Justice, Office of Justice Programs, National Institute of Justice Research Report, entitled, *Fire and Arson Scene Evidence: A Guide for Public Safety Personnel*.
- United States Department of Justice, Office of Justice Programs, National Institute of Justice Research Report, entitled, *A Guide for Explosion and Bombing Scene Investigation*.

### **Specific Compliance with the Intellectual Standards of Critical Thinking**

The intellectual standards of critical thinking can logically be thought of as an extension of the scientific method and are most prevalently discussed in academic research fields. Despite that prevalence, however, they provide an outline for a more diverse application of the scientific method in scientific and engineering endeavors as well.

The intellectual standards of critical thinking as applied during a fire and explosion investigation and analysis include the following:

- ***Clarity*** - clear and understandable.
- ***Accuracy*** – free of error.
- ***Precision*** - exact to the necessary level of detail.
- ***Relevance*** – relative to the issue at hand.
- ***Depth*** - containing complexities and multiple interrelationships.
- ***Breadth*** - encompassing multiple viewpoints.



- *Logic* - concepts make sense together with no contradictions.
- *Significance* - focusing on the important.
- *Fairness* – justifiable and not overstated.

### **Specific Compliance with the Process of Analyzing Competing Hypotheses**

During the investigation and analysis of the hostile fire incident that is the subject of this civil litigation, the investigating expert employed a recognized process in the analysis of potential competing hypotheses.

The process of the analysis of potential competing hypotheses, first developed by the intelligence community, is an intellectual critical thinking tool that is applicable and adaptable to the investigation and analysis of the occurrence of hostile fire and explosion incidents. The analytical analysis process incorporates the careful weighing of alternative explanation and conclusions when judging and evaluating issues during the investigative process.

The process of the analysis of potential competing hypotheses has its roots in cognitive psychology, the branch of psychology concerned with the acquisition, processing, and storing of information, decision analysis, the discipline comprising the philosophy, theory, methodology, and professional practice necessary to address important decisions in a formal manner and the scientific method.

The primary steps in this analytical process include:

- Identification of potential competing hypotheses.
- Enumeration of significant evidence and arguments for and against each hypothesis.
- Development of an analysis matrix.

- Development of tentative conclusions about the likelihood of each potential competing hypothesis and attempts to disprove each.
- Analysis of the impact of the subsequent conclusions.
- Reporting of the selection of the final hypotheses.

### **Specific Compliance with the Guidelines of National Fire Code NFPA 921**

During the investigation and analysis of the hostile fire incident that is the subject of this civil litigation, the investigating expert applied and followed the recognized and accepted practices and methodologies of the fire and explosion investigation and analysis profession. The recognized and accepted practices and methodologies of the fire and explosion investigation and analysis profession that were applied and followed are contained within the National Fire Code NFPA 921, entitled Guide for Fire and Explosion Investigations.

I am keenly aware of the recognized and accepted practices and methodologies of the fire and explosion investigation and analysis profession that are contained within the National Fire Code NFPA 921, entitled Guide for Fire and Explosion Investigations, because I was one of the document's original authors.

The practices and methodologies contained in National Fire Code NFPA 921 provide guidelines and ensure the accuracy of all aspects of a fire or explosion investigation and analysis. The practices and methodologies of the fire investigation and analysis profession enumerated in National Fire Code NFPA 921 are based upon well-established and generally recognized and accepted scientific principles and research.

The practices and methodologies of the fire investigation and analysis profession enumerated in National Fire Code NFPA 921 are also based upon the collective laws of physics, thermal dynamics, and fluid dynamics.

The application of the recognized and accepted practices and methodologies of the fire and explosion investigation and analysis profession as embodied in National Fire Code NFPA 921 insured the accuracy of the investigating expert's findings and conclusions. The continuing applicability and accuracy of the practices and methodologies contained in National Fire Code NFPA 921 are insured through a peer reviewed and mandatory review process mandated and monitored by the National Fire Protection Association's Standards Council. The peer review process solicits input from the fire and explosion investigation and analysis profession at large and requires a review and validation process of each and every submitted proposal resulting in a true consensus document.

The continuing applicability and accuracy of the practices and methodologies contained in National Fire Code NFPA 921 are also insured by the adherence of the aforementioned review process guideline established by the American National Standards Institute (ANSI).

The application and use of the practices and methodologies contained in National Fire Code NFPA 921 is prevalent throughout the United States and the world by all aspects of the fire protection community, both in judicial and non-judicial venues.

### **Specific Compliance with the Guidelines of National Fire Code NFPA 1033**

The application and use of the recognized and accepted practices and methodologies contained in National Fire Code NFPA 921 are also guided by National Fire Code NFPA 1033 entitled, Professional Qualifications for Fire Investigators. The latter is generally viewed as a companion document that defines job performance requirements.

National Fire Code NFPA 1033 represents job performance requirements for fire and explosion investigators and adherence to its provisions insures consistency and accuracy of fire and explosion investigations. The application of the job performance requirements contained in National Fire Code NFPA 1033 insured the accuracy of my findings and conclusions.

The continuing applicability and accuracy of the job performance requirements contained in National Fire Code NFPA 1033 are insured through a peer reviewed and mandatory review process mandated and monitored by the National Fire Protection Association's Standards Council. The peer review process solicits input from the fire and explosion investigation and analysis profession at large and requires a review and validation process of each and every submitted proposal resulting in a true consensus document.

The continuing applicability and accuracy of the job performance requirements contained in National Fire Code NFPA 1033 are also insured by the adherence of the aforementioned review process guidelines established by the American National Standards Institute (ANSI).

The application and use of the job performance requirements contained in National Fire Code NFPA 1033 is prevalent throughout the United States and the world by all aspects of the fire protection community, in both judicial and non-judicial venues.

### **Specific Deference to National Fire Code NFPA 1033**

Fire and explosion investigators and analysts are required to achieve and then maintain topical education and training that focuses on the following core topics: Fire science; Fire chemistry; Thermodynamics; Thermometry; Fire dynamics; Explosion dynamics; Computer fire modeling; Fire investigation; Fire analysis; Fire investigation methodology; Fire investigation technology; Hazardous materials; Failure analysis and analytical tools; Fire protection systems; Evidence documentation, collection, and preservation; and Electricity and electrical systems.

Deference to these requirements contained in the appropriate edition of National Fire Code 1033 insured the accuracy of my findings and conclusions.

### **Specific Compliance with the Guidelines of National Fire Code NFPA 1730**

The application and use of the recognized and accepted practices and methodologies contained in National Fire Code NFPA 921 are also guided by National Fire Code 1730, entitled, Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations.

National Fire Code NFPA 1730 represents requirements for the organization and deployment of fire and explosion investigators and adherence to its provisions insures consistency and accuracy of fire and explosion investigations. The application of such requirements contained in National Fire Code NFPA 1730 insured the accuracy of my findings and conclusions.

The continuing applicability and accuracy of the organization and deployment requirements contained in National Fire Code NFPA 1730 are insured through a peer reviewed and mandatory review process mandated and monitored by the National Fire Protection Association's Standards Council. The peer review process solicits input from the fire and explosion investigation and analysis profession at large and requires a review and validation process of each and every submitted proposal resulting in a true consensus document.

The continuing applicability and accuracy of the organization and deployment requirements contained in National Fire Code NFPA 1730 are also insured by the adherence to the aforementioned review process guidelines established by the American National Standards Institute (ANSI).

The application and use of the job performance requirements contained in National Fire Code NFPA 1730 is prevalent throughout the United States and the world by all aspects of the fire protection community, both in the judicial and non-judicial venues.

### **Specific Deference to Value Based Ethics – Core Values**

The professional practice of fire and explosion investigation and analysis subscribes to a common set of generally recognized and accepted value-based ethics which include the following core values:

- Truthfulness
- Honesty
- Following the law
- Uncovering wrongdoing
- Accuracy
- Fairness
- Humanity
- Responsiveness
- Integrity
- Stewardship
- Concern for the public good

### **Summary of the Hostile Fire Incident**

On Sunday, December 12, 202, the plaintiff, Matthew Wadsworth, purchased the artifact Jetson hoverboard from the Walmart located at 201 Gateway Boulevard in Rock Springs, Wyoming 82901. The line item on the cash register receipt identified the artifact Jetson Plasma hoverboard as “081199103159.” As part of that same purchase, he also purchased a 2-year service plan. The

line item on the cash register receipt identified the 2-year service plan as “084375518445.”

On Monday, January 31, 2022, (night before the fire), as documented and memorialized in the Sweetwater County Sheriff’s Department Incident Report for Incident #S22-01535, the juvenile boy, Gunner Wadsworth, stated that he and his brother the juvenile boy, Layne Wadsworth had gone to bed in the bedroom later identified by the governmental entities and me as the room of origin. Specifically, he stated that he was on the top of the bunk bed while his brother, Layne Wadsworth, was on the bottom bed. Lastly, he stated that they normally close the bedroom door at night.

The juvenile boy, Gunner Wadsworth, further reported that the artifact Jetson hoverboard had been used that night and had been plugged in to recharge in the bedroom that he and his brother, Layne Wadsworth, share.

On Tuesday, February 1, 2022, at approximately 3:30 AM (0330), as documented and memorialized in the Sweetwater County Sheriff’s Department Incident Report for Incident #S22-01535, the juvenile boy, Gunner Wadsworth, further stated that he had gotten up and gone to the bathroom. Specifically, he stated that he recalls checking the time on his tablet which he usually takes with him when using the bathroom and noted that it displayed that approximate time.

Both juvenile boys reported waking up to smelling smoke and feeling heat some time thereafter near the closet adjacent to the end of their bed. More specifically, they reported seeing flames which the juvenile boy, Layne Wadsworth, described as a glow. They also reported hearing activated smoke alarms sounding.

After exiting their shared bedroom, they went to the living room where they reported joining the juvenile girl, Kamille Wadsworth, and collectively they woke up their mother, Stephanie Wadsworth, who was sleeping in the living room. The juvenile girl, Kamille Wadsworth, reported that she had been woken up by screams from her brothers and the activated smoke alarms. As she

was traversing the bedroom hallway, she stated that she observed flames in her brothers' bedroom (Gunner and Layne) near the bunk bed and window.

Upon waking their mother, the children reported that she instructed them to exit the home while she endeavored to wake up the other juvenile son, Weston Wadsworth, who was sleeping in a different bedroom. The juvenile boys further stated that they were unable to exit the involved residential structure through the front door where they observed active fire and alternatively utilized the kitchen door leading to the garage.

Lastly, the juvenile, Kamille Wadsworth, reported observing the passerby, Ryan Pasborg, enter the residential structure and rescue both the juvenile boy, Weston Wadsworth, and her mother, Stephanie Wadsworth, and get them outside.

On Tuesday, February 1, 2022, at or about 4:27 AM (0427), the Sweetwater County Sheriff's Office and the Green River Fire Department responded to the area of 1620 Highway 374, Green River (Sweetwater County), Wyoming 82935. Again, the response is documented and memorialized in the Sweetwater County Sheriff's Department Incident Report for Incident #S22-01535.

Concurrent with their response, emergency medical services (EMS) personnel also responded to the hostile fire incident to triage and treat those Wadsworth family members requiring emergency medical intervention. Specifically, the plaintiff, Stephanie Wadsworth, and her juvenile son, Weston Wadsworth, were transported first to Memorial Hospital of Sweetwater County. Both were subsequently transferred to the University of Utah Burn Center.

The Green River Fire Department reportedly cleared the scene at or about 11:15 AM (1115) according to associated dispatch log entries.





**Image:** *Photograph of the front of the involved residential structure.*

As documented and memorialized in the Sweetwater County Sheriff's Department Incident Report for Incident #S22-01535, the reporting person, Ryan Pasborg, stated that on February 1, 2022, at or about 4:20 AM (0420) he was traveling on Highway 374 towards Green River, Wyoming going to work when he first smelled smoke and then saw smoke and flames coming from the involved residential structure. After pulling into the driveway, stopping on the northwest side of the involved residential structure and exiting his truck, he reported observing flames coming out of the window near the front door of the residential structure. It should be noted that this window is in the bedroom located on the north side of the bedroom hallway immediately adjacent to or behind the kitchen.



**Image:** *Photograph of the window to the bedroom (room of origin).*

In his interview with Detective Sheaman, the following information was obtained and memorialized: “Ryan stated he witnessed a young girl and two young boys walk out of a door on the north side of the house, leading into the garage. Ryan stated the three children said their brother was still inside so he entered the home through the garage door and up several steps into the kitchen. (Det. Sheaman had noticed a door leading from the kitchen into the garage during his origin and cause investigation). Ryan stated he could not see anything inside the residence because of the heavy smoke. He stated he did not know what room he was in or where the fire was. He stated he low crawled into the house and heard smoke detectors going off. Ryan stated he only crawled into the residence approximately 2-3' when he bumped into a small child, who he stated

was on his hands and knees. Ryan stated he grabbed the child around the waist, picked him up and carried him outside through the garage door.

Ryan explained when he brought the child outside, he put him and the three other children in his truck to keep them warm. He then stated the children mentioned that their mother was still inside the residence.

Ryan stated he again entered the home through the garage door and he again low crawled into the residence through the door leading from the kitchen to the garage. He stated he bumped into a woman, who was lying on her back. He stated she was lying on the floor approximately 2-3' further from where he believed he found the child. (By his description, Det. Sheaman believed that both Weston and Stephanie would have been in the kitchen area of the residence). Ryan stated Stephanie was "gurgling" when he found her. Ryan explained he positioned himself near Stephanie's head and he grabbed her under her arms to try and lift her to drag her out of the residence. Ryan stated when he lifted Stephanie, he felt what he believed her skin "smear" off of her arms.

Ryan described having to stay low and drag Stephanie out of the house. He explained that once outside, he laid her on the ground between the house and where his work truck was parked. He stated he believed he heard her take her last breath and he decided to perform CPR. Ryan, who is a volunteer Firefighter in Superior, stated he performed two sets of chest compressions and gave Stephanie two breaths between compressions. He stated Stephanie took a "gasp of air" and she sat up and stood up. Ryan stated he escorted her to his truck where she sat on the back seat on the driver's side. Ryan explained she was sitting on her knees on the bench seat and was turned inward, facing the young girl and two boys. He stated the other boy was in the front passenger side seat.

Ryan stated he got into the truck and drove to the end of the driveway to meet EMS and fire personnel."

Upon the arrival of responding personnel, the first arriving sheriff's deputy (Deputy Sheriff

Hansen) was informed by the reporting person (Ryan Pasborg) that he had assisted in getting the occupants out of the involved structure, namely, an adult female and four (4) children. The reporting person further advised that he had escorted the evacuated occupants to his parked motor vehicle. The reporting person still further advised that the adult female had sustained significant thermal burn injuries.

Deputy Sheriff Hansen summarized his initial activities as follows: “DS Hansen advised EMS of the location of the patients and patient update. DS Hansen observed an EMT arrive and start to evaluate the patients in the truck. DS Hansen went to the house to make sure no other people were in the residence. DS Hansen observed a house engulfed in flames. Heavy smoke prevented deputies from getting a decent visual of the interior of the residence. DS Hansen walked around the entire perimeter of the house and observed a power line that was connected to the house was down on the ground, still connected to the power pole but detached from the house. DS Hansen observed the electricity breaker to shut the power off was in the engulfed area. DS Hansen did not discover any signs of anyone being inside the house at that time.”

The hostile fire incident involved a single-family, year-round residential structure. While the involved building has been described by some as a multi-story structure, the main occupied living space is located on a single level. The structure was regularly occupied by adults Matthew and Stephanie Wadsworth and their juvenile children, Kamille Wadsworth, Gunner Wadsworth, Layne Wadsworth, and Weston Wadsworth. At the time of the occurrence of the hostile fire incident, however, the plaintiff, Matthew Wadsworth, was at work.

The Green River Fire Department subsequently arrived at the scene and extinguished the hostile fire incident. After extinguishment, the Green River Fire Department requested the assistance of the Sweetwater County Sheriff’s Department’s Detective Division in the investigation of the hostile fire incident. In response to that request, Sergeant Hall and Detective Sheaman were advised of the request and accepted the assignment.



On Tuesday, February 1, 2022, at or about 1:00 PM (1300), as documented and memorialized in the Sweetwater County Sheriff's Department Incident Report for Incident #S22-01535, Detective Sheaman commenced his investigation of the hostile fire incident scene.

On Tuesday, February 2, 2022, as documented and memorialized in the Sweetwater County Sheriff's Department Incident Report for Incident #S22-01535, Detective Sheaman conducted a recorded in-person interview with the reporting person, Ryan Pasborg, at the Sweetwater County Sheriff's Department.

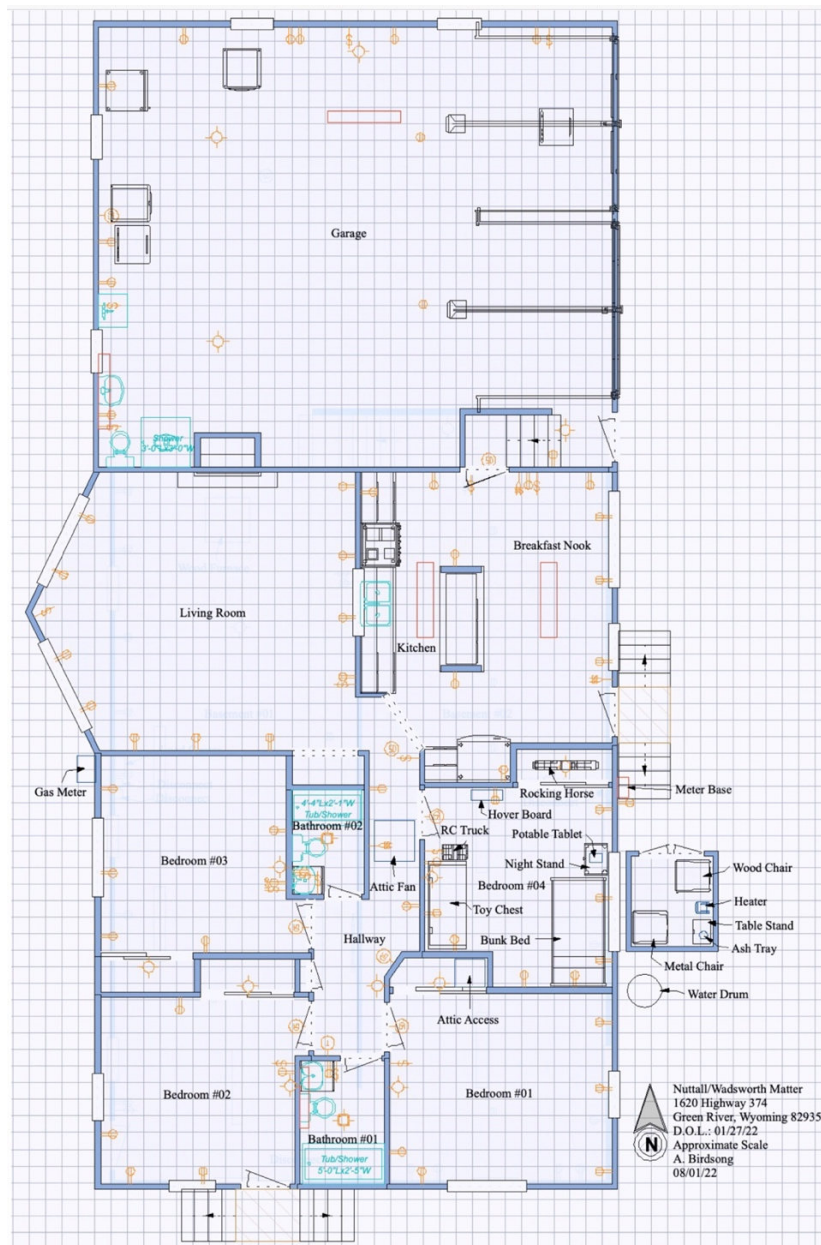
On Tuesday, February 2, 2022, as documented and memorialized in the Sweetwater County Sheriff's Department Incident Report for Incident #S22-01535, Detective Sheaman conducted a recorded telephone interview with the plaintiff Matthew Wadsworth.

On Wednesday, February 3, 2022, as documented and memorialized in the Sweetwater County Sheriff's Department Incident Report for Incident #S22-01535, Detective Sheaman responded to the Walmart located in Rock Springs, Wyoming and confirmed that the data and information on the Walmart cash register receipt in the possession of the plaintiff, Matthew Wadsworth, was correct relative to a "Plasma IRS HOVBRD" with a UPC code ending in "3159."

On Friday, March 4, 2022, at or about 2:00 PM (1400), as documented and memorialized in the Sweetwater County Sheriff's Department Incident Report for Incident #S22-01535, Detective Sheaman conducted recorded in-person interviews with the juvenile members of the Wadsworth family, namely, Kamille Wadsworth, Weston Wadsworth, Gunner Wadsworth and Layne Wadsworth.

## Involved Residential Structure

The residential structure in which the hostile fire incident occurred was diagramed and annotated as follows;



**Diagram:** *Main floor of the involved residential structure.*



**Diagram:** Below grade floor of the involved residential structure.

### **Adverse Consequences of the Occurrence of the Hostile Fire Incident**

As a result of the occurrence of the hostile fire incident, two (2) occupants of the involved structure, namely, Stephanie Wadsworth and her son Weston Wadsworth sustained significant thermal burn injuries and were transported to Memorial Hospital of Sweetwater County. They were both subsequently transferred to the University of Utah Burn Center.

In addition, the involved residential structure sustained significant fire related property damage. As a result of that damage, it was rendered inhabitable.

### **Previous Investigation by Governmental Entities**

The occurrence of the hostile fire incident was previously investigated by the Green River Fire Department. That investigation is documented and memorialized in a Supplemental Narrative contained within the Sweetwater County Sheriff's Department Incident Report for Incident #S22-01535.

As indicated in that Supplemental Narrative, both Assistant Fire Chiefs Bill Robinson and Larry Erdman of the Green River Fire Department both had concluded that the area of origin of the hostile fire incident was in the bedroom located on the north side of the bedroom hallway immediately adjacent to or behind the kitchen. More specifically, they concluded that the specific origin of the hostile fire incident was located near where the remains of a lithium battery powered hoover board were located.

The occurrence of the hostile fire incident was also investigated by the Sweetwater County Sheriff's Department Detective Sheaman who is reported to be a certified origin and cause investigator in the State of Wyoming. He was accompanied by Assistant Fire Chiefs Bill Robinson and Larry Erdman of the Green River Fire Department. Sweetwater County Sheriff's Department



Sergeant Hall also responded later to provide additional assistance.

That investigation is documented and memorialized in the Sweetwater County Sheriff's Department Incident Report for Incident #S22-01535. The investigation was closed on 03/04/22 by Detective Sheaman with a disposition of "Case closed pending further information."

Detective Sheaman concluded that "Either size, the door would have opened towards the wall, opposite of the kitchen, closely to where the Hoverboard was resting. If there was a door hung and it was opened or partially opened, the Hoverboard could have caught fire and severe heat from the fire could have been isolated momentarily in the void between the door and the wall. (The damage to that area showed this to be a credible hypothesis)."

On November 16, 2023, Detective Sheaman also participated in a discovery deposition taken during the civil litigation. During the course of that discovery deposition, he further memorialized his investigation and offered the following additional findings and conclusions:

- That he found no evidence to support a conclusion that the hostile fire incident originated outside of the residential structure.
- That he is aware of no data or information to change his finding and conclusion relative to the origin of the hostile fire incident.
- That he is aware of no data or information to change his finding and conclusion relative to what caused the hostile fire incident.
- That knowing when the power went out to the house would not change his findings and conclusions relative to the origin and cause of the hostile fire incident.
- That he observed melted plastic covering the lower half of the duplex outlet near the bedroom door with wires protruding from that plastic which was indicative that something was plugged into the lower portion of the outlet.
- That based on his interview with Gunner Wadsworth and Lanye Wadsworth, he understood

them to say that they saw smoke and flames inside their room.

- That he gained knowledge from his interview of Matthew Wadsworth that the electrical outlet that Gunner Wadsworth and Lanye Wadsworth normally use to charge the artifact hoverboard is the same as the one he observed wires protruding from.
- That the hostile fire incident originated in the bedroom and that it was caused by the artifact hoverboard.
- That three (3) different fire investigators from both the fire department and law enforcement arrived at the same findings and conclusions.
- That no one told him that anything other than the artifact hoverboard was plugged into the duplex electrical outlet.
- That no one has shared any actual evidence that the electric space heater was turned on in the outside shed.

### **Scope of the Forensic Investigation and Analysis**

In general, the scope of the forensic investigation and analysis was to evaluate the origin of the hostile fire incident, to evaluate the ignition sequence (cause) of the hostile fire incident and to evaluate the responsibility for the occurrence of the hostile fire incident and its adverse and undesired consequences including both personal injury and property damage.

More specifically, however, the scope of the forensic investigation and analysis included the following:

- To evaluate the initiation of the hostile fire incident.

The initiation of the hostile fire incident is defined as the analysis of the relationships of the fuel source, competent source of heat energy and oxidizing agent. The initiation of the hostile explosion/fire incident also analyzes the nature of the uninhibited chemical chain reaction.

- To evaluate the nature of the hostile fire incident.

The nature of a hostile fire incident is defined as description of the physical conditions and consequences which were present immediately prior to and during the occurrence of the hostile explosion/fire incident.

- To evaluate the origin of the hostile fire incident.

The area of origin of a hostile fire incident is defined as where the incident began. The point of origin of a hostile fire incident is defined as the exact physical location where a heat source and a fuel came in contact with each other, and a hostile explosion/fire incident begins.

- To evaluate the first fuel ignited in the hostile fire incident.

The first fuel ignited is defined as the first fuel that is ignited by a competent source of ignition.

- To evaluate the ignition sequence (cause) of the hostile fire incident.

The ignition sequence (cause) of a hostile fire incident is defined as the circumstances, conditions or agencies that bring together the first fuel ignited and a competent source of ignition (heat energy) contemporaneous with a sufficient concentration of air or oxygen.

- To evaluate the classification of the cause of the hostile fire incident.

The classification of the cause of a hostile fire incident is defined relative to the interaction and/or lack of human interaction with regard to its initiation.

- To evaluate the development, progression, propagation, and fire flow path of the hostile fire incident.

The development, progression, propagation, and fire flow path of a hostile fire incident is defined as the actual physical movement or fire flow path of the hostile explosion/fire incident following its initiation.

- To evaluate the effects of the hostile fire incident on the victims.

The effects of a hostile fire incident are defined as the consequences of the occurrence of the hostile fire incident as a result of the undesired and unexpected presence of combustion by-products.

- To evaluate the responsibility for the occurrence of the hostile fire incident.

The responsibility for the occurrence of a hostile fire incident is defined as the accountability of a person or other entity for the event or sequence of events that caused the fire or explosion spread of fire, bodily injuries, loss of life, or property damage.

### **Recognition of the Potential for and Mitigation of Investigative Biases**

During the forensic investigation and analysis of a hostile fire incident, it is imperative that there is a recognition of and appropriate mitigation of potential investigative biases. The three prevalent potential investigative biases are those of presumption, expectation bias and confirmation bias.

National Fire Code NFPA 921, entitled Guide for Fire and Explosion Investigations, cautions against developing a hypothesis until the requisite data and information have been collected. It is important that no presumptions be made relative to the hostile fire incident's origin, to its ignition sequence (cause) or relative to the responsibility for its occurrence until a properly executed forensic investigation and analysis fosters a defensible hypothesis.

National Fire Code NFPA 921 broadly regards expectation bias as "a well-established phenomenon that occurs in scientific analysis when investigator(s) reach a pre-mature conclusion without having examined or considered all of the relevant data." The adverse effect of expectation bias is such that only data and information that tends to support an ill-conceived or prematurely formed hypothesis, real or perceived, is considered, while rejecting or misinterpreting other relevant and germane data and information that may actually facilitate an accurate forensic investigation and analysis.

This same document regards confirmation bias as occurring whenever the testing of a derived

hypothesis fails to consider other alternative hypotheses. The equally adverse effect of confirmation bias is that data and information that legitimately supports another potential competing, or alternative hypothesis is not appropriately considered and/or tested.

During the investigation and analysis of a hostile fire incident, then, it was of paramount importance that the fire and explosion investigator and analyst remain in strict compliance with the scientific method, the intellectual standards of critical thinking, the analysis of competing hypotheses, the guidelines of the National Fire Code NFPA 921 and the guidelines of the National Fire Code NFPA 1033 as was previously affirmed.

### **Overview of the Forensic Investigation and Analysis**

The forensic investigation and analysis of the hostile fire incident was initiated and undertaken by the undersigned. Any and all investigative activities and analyses conducted at the request of the aforementioned client were conducted by myself and/or colleague Austin Birdsong.

On February 17, 2022, I consulted with my aforementioned client, conducted a conflict of interest check, opened a new case file, and conducted web-based background research on the occurrence of the hostile fire incident.

On February 19, 2022, I submitted Freedom of Information (FOIA) requests with the Green River, Wyoming Fire Department and the Sweetwater County Sheriff's Department. In addition, I conducted preliminary research relative to local building and fire codes and standards.

On February 22, 2022, I conducted limited preliminary research of Jetson Plasma hoverboards as was identified by my aforementioned client, Greyson Goody.



**Image:** Walmart receipt documenting purchase of artifact Jetson hoverboard.

On March 16, 2022, I read and reviewed documents shared by the plaintiffs' homeowner's insurance company's retained consultant, IC Specialty Services and specifically Cristol VanDongen. I also reviewed and analyzed a compilation of investigative photographs shared by same.

On May 17, 2022, I traveled to Green River, Wyoming in preparation for my participation in a joint inspection of the hostile fire incident scene hosted by the plaintiffs' homeowner's insurance company's retained consultant, IC Specialty Services and specifically Cristol VanDongen.

On May 18, 2022, I monitored and participated in that joint inspection of the hostile fire incident scene. The joint inspection was commenced pursuant to a written inspection protocol developed and written by IC Specialty Services. I completed a preliminary inspection and evaluation of the hostile fire incident scene which was limited to visual, non-intrusive and non-destructive investigation activities only. I also photographically documented same through digital color still photography.

The originally proposed inspection sequence for this joint inspection included the following investigative activities:

- “A pre-inspection meeting will be held prior to the inspection of the property. This meeting will be held at the loss site prior to any inspections.
- Visual inspection of the loss site. Each participant will be allowed to photograph and document the property/fire loss.
- Photographic documentation may be taken at any time during the inspection.
- Removal of debris and fire scene reconstruction. If necessary, the removal and sifting of fire debris will be conducted. The area of origin may be reconstructed if possible. Any artifacts found during this process will be collected as evidence, if necessary, following the guidelines set-forth in this document.
- Testing of building equipment, building utilities, and building materials, if necessary, as agreed upon by all participants, may be conducted.
- Identification of artifact(s) to be collected as evidence. If necessary, evidence will be identified by each participant, following the guidelines set-forth in this document, and removed from the property. Participants must, by the termination of the inspection, inform the site manager of all evidence they wish to be collected.

- Final Meeting. A final meeting of all participants will be conducted at the conclusion of the inspection.”

During that joint inspection, I conducted a heat and flame vector analysis of the hostile fire incident scene and involved residential structure to determine its area of origin. During that same inspection, other potential interested parties were identified.

Physical evidence which had been previously preserved and collected from the hostile fire incident scene by the plaintiffs’ homeowner’s insurance company’s retained consultant, IC Specialty Services and specifically, Cristol VanDongen, was displayed for a visual, non-intrusive and non-destructive inspection.

By agreement of the interested parties present, the physical evidence continued to be maintained by IC Specialty Services for the benefit of all the interested parties.

The joint inspection was suspended prior to any intrusive and/or destructive investigation activities pending a future recommencement. My aforementioned client, Greyson Goody, was subsequently informed of the identification of those other potential interested parties.

The joint inspection was suspended to facilitate notification of all persons and or entities who had or may have a legal interest in the continued joint inspection of the hostile fire incident scene. It was also suspended to facilitate a more thorough documentation of the hostile fire incident scene utilizing 3-D photographic equipment. This documentation was deemed necessary by the interested parties present prior to the anticipated intrusive and destructive investigative activities necessary to appropriately process the hostile fire incident scene thereafter.





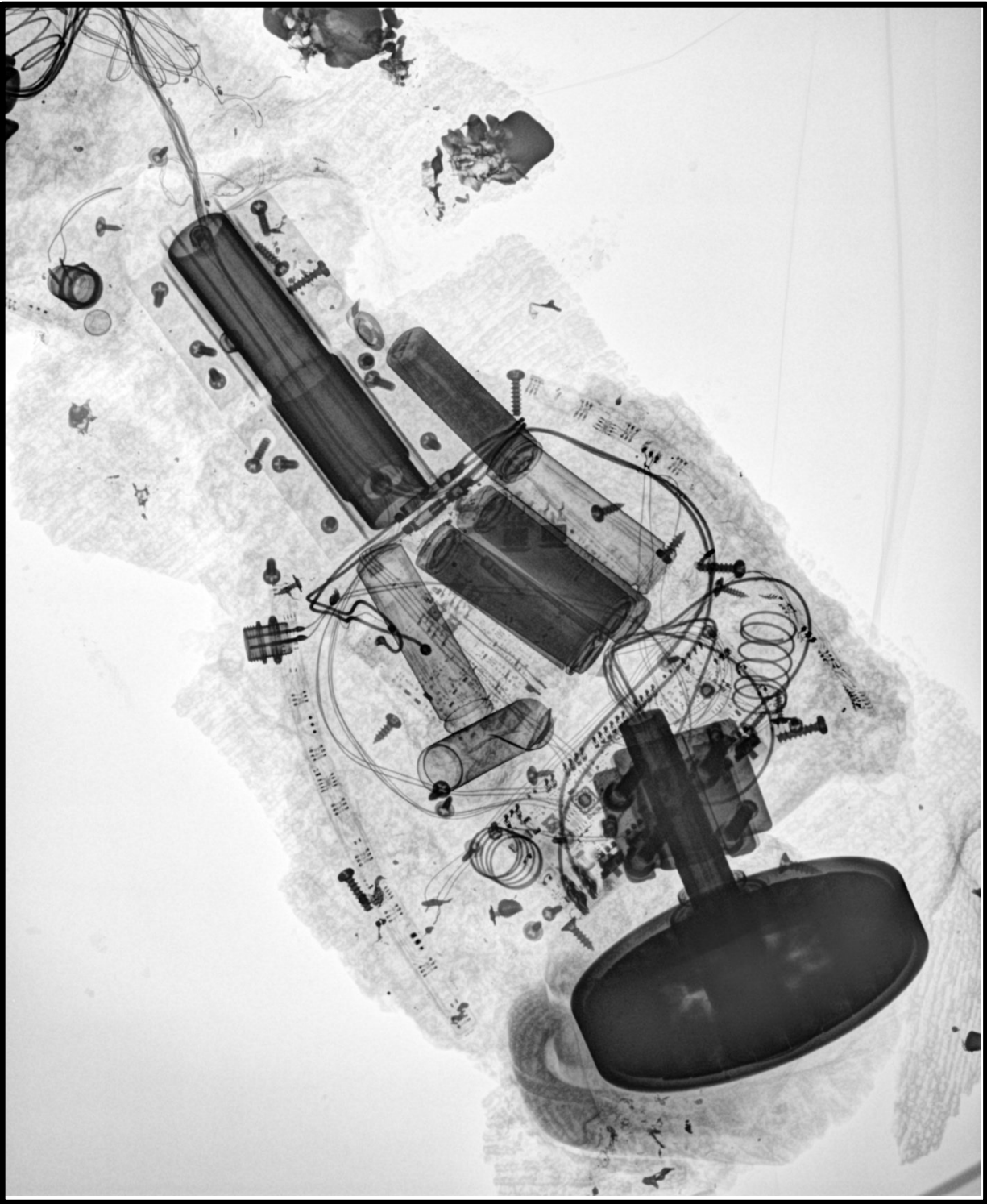
**Image:** *Photograph of the artifact hoverboard previously collected and preserved from the hostile fire incident scene.*

On July 26, 2022, by mutual agreement of the interested parties, the remains of the artifact Jetson hoverboard which was previously preserved and collected from the hostile fire incident scene were subjected to x-ray documentation. That x-ray image was coordinated and supervised by the plaintiffs' homeowner's insurance company's retained consultant, IC Specialty Services and specifically Cristol VanDongen.



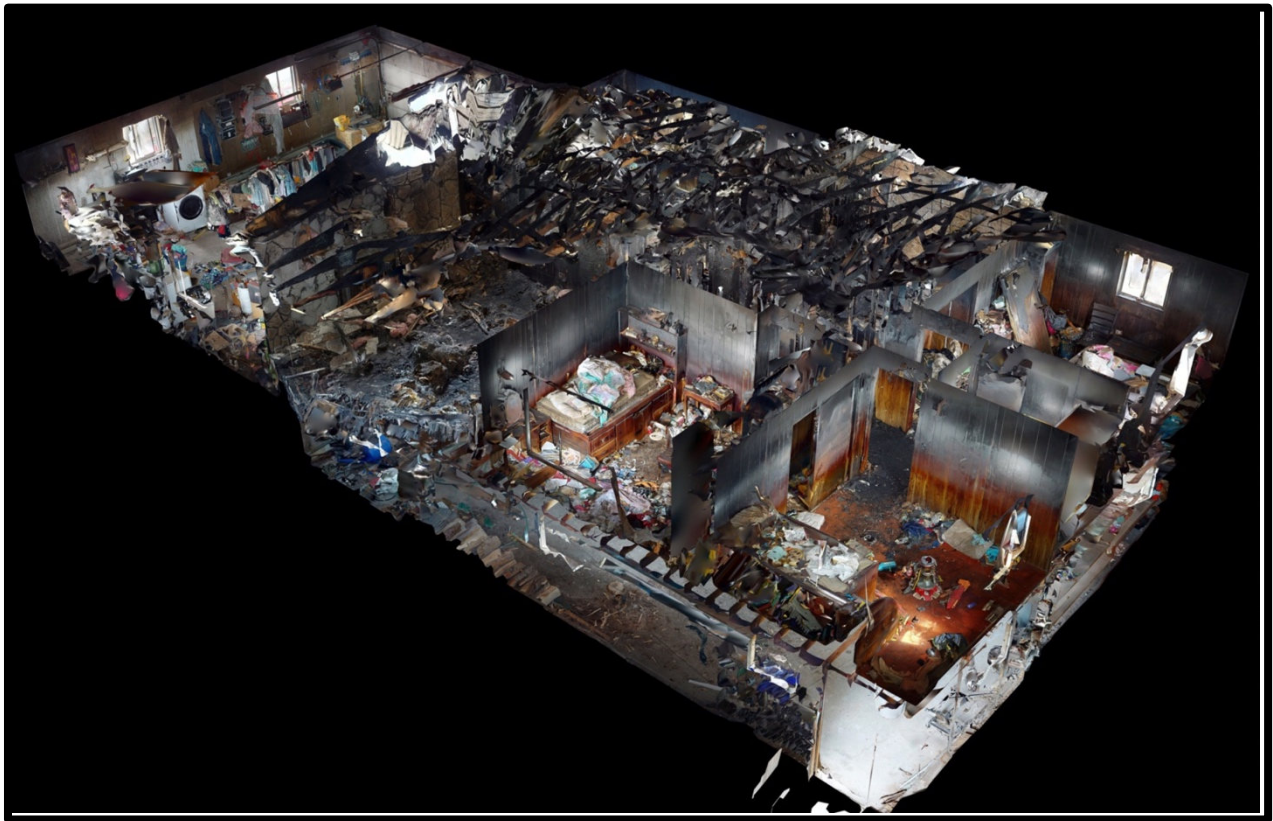
**Image:** *X-ray image of the artifact hoverboard.*





**Image:** *X-ray image of the artifact hoverboard.*

On August 1, 2022, in preparation for the continuation of the joint inspection of the hostile fire incident scene, I dispatched Austin Birdsong of Apex Fire Services to document same using 3-D Matterport photographic technology. The documentation activity was commenced pursuant to a written inspection protocol developed and written by M.J. Schulz & Associates, Inc.



**Image:** *“Doll House” depiction of the 3-D Matterport photographic documentation of the hostile fire incident scene.*

On August 2 - 4, 2022, I dispatched Austin Birdsong of Apex Fire Services to execute the continuation of the visual, intrusive and potentially destructive inspection, examination and analysis of the involved residential structure and/or physical evidence remaining therein. The joint inspection was commenced pursuant to a written inspection protocol developed and written by M.J. Schulz & Associates, Inc.

The methodology for this continued joint inspection included the following:

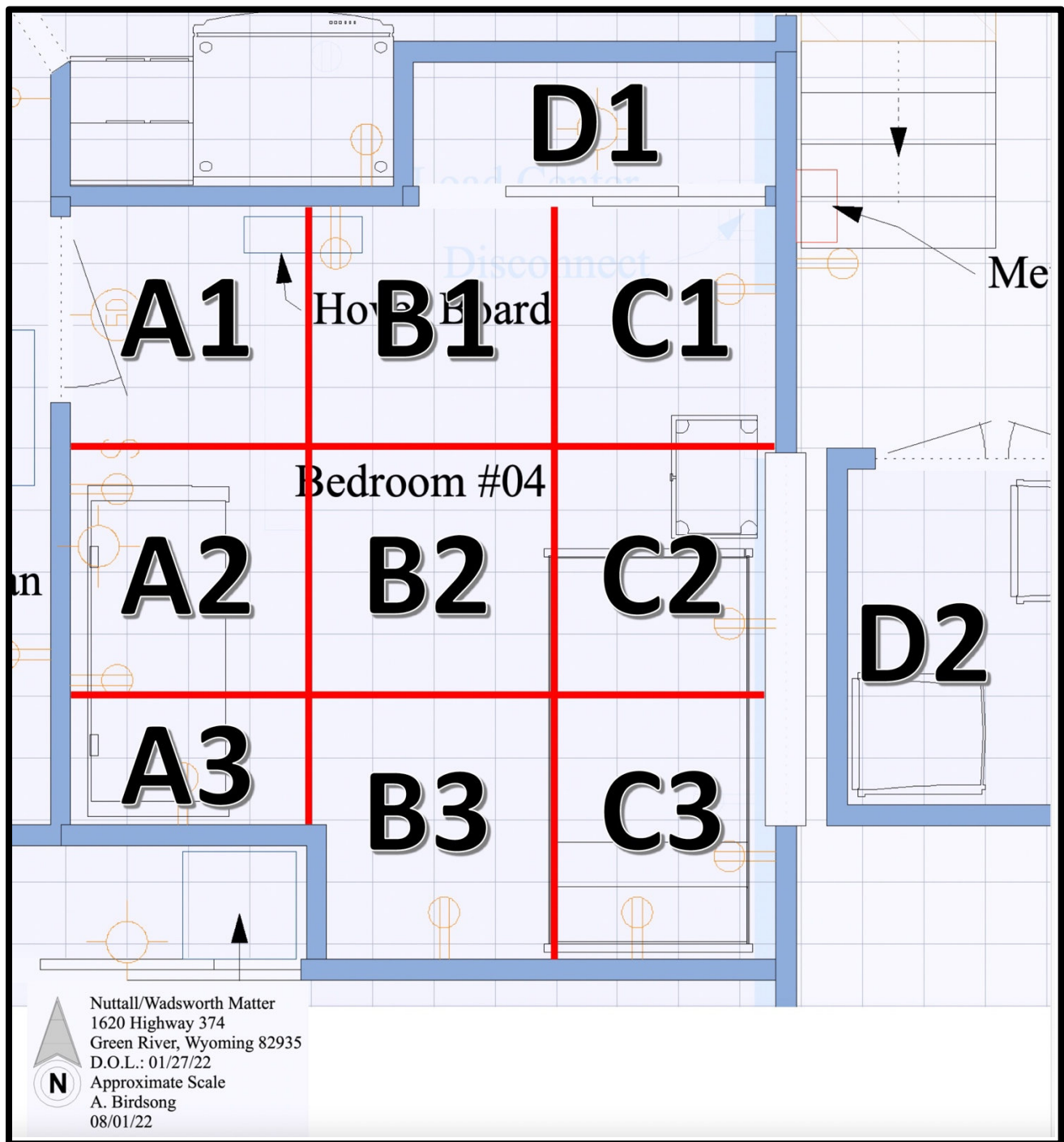
- The convening of a morning briefing, to be attended by all participants and to commence at approximately 9:00 AM on the day(s) of the investigation, to discuss the execution of the primary provisions of this protocol.
- The execution of an inspection attendance sign-in sheet that includes the names, businesses, addresses, telephone numbers, electronic mail addresses and affiliations of any and all persons who enter the incident scene.
- 360-degree photographic documentation of the involved residential structure with a Matterport camera.
- Photographic documentation of the involved residential structure and/or physical evidence remaining therein with digital still cameras.
- Preliminary inspection of the involved residential structure and/or physical evidence remaining therein by the recently notified interested parties.
- The division of the room of origin (children's bedroom) of the involved residential structure into manageable and defined search grids of an appropriate size and configuration not to exceed four feet by four feet.
- The identification of each of the defined search grids with a unique numeric or alphanumeric identification.
- The hand search of each of the defined search grids.
- The identification of any and all relevant items of physical evidence located in each of the defined search grids.
- The photographic documentation of the aforementioned relevant items of physical evidence located in each of the defined search grids.
- The segregation collection, and preservation of all electrical devices located within each of the defined search grids.

- The segregation, collection, and preservation of any smoke detector/alarm located within each of the defined search grids.
- The segregation, collection, and preservation of all sources of ignition located within each of the defined search grids.
- The segregation, collection, and preservation of any other items of mutual interest located within each of the defined search grids.
- The segregation, collection and preservation of all other debris located within each of the defined search grids for future sifting by storage in plastic storage containers.
- The removal and collection of all branch circuit electrical components, i.e., electrical switches, electrical outlets and connected electrical devices located within or shared with the room of origin (children's bedroom) of the involved residential structure.
- The tracing of the branch circuit supplying the room of origin (children's bedroom) of the involved residential structure.
- The identification of the circuit protection scheme protecting the branch circuit supplying the room of origin (children's bedroom) of the involved residential structure.
- The segregation, collection, and preservation of the circuit protection scheme (circuit breaker) protecting the branch circuit supplying the room of origin (children's bedroom) of the involved residential structure.
- The segregation, collection and preservation of the refrigerator and its power supply cord which shares an electrical supply with the room of origin (children's bedroom) of the involved residential structure.
- The tracing of the branch circuit supplying that refrigerator.
- The identification of the circuit protection scheme protecting the branch circuit supplying that refrigerator.

- The segregation, collection, and preservation of the circuit protection scheme (circuit breaker) protecting that refrigerator.
- The segregation, collection, and preservation of any smoke detector/alarm located within other rooms or areas of the involved residential structure.
- The hand search of the living room of the involved residential structure for the charging block and associated charging cord of the rechargeable remote-control vehicle previously located and preserved from the room of origin (children's bedroom) of the involved residential structure.
- The hand search of the kitchen counters for the second rechargeable remote-control vehicle and its charging block and associated charging cord.
- The hand search of any other areas of the involved residential structure of mutual interest.
- The appropriate packaging of all additional items of physical evidence located within the involved structure.
- The appropriate labeling and inventory of the additional items of physical evidence located within the involved structure.
- The removal and preservation of all identified and tagged items of physical evidence located within the involved structure.
- The convening of a daily afternoon briefing to discuss the execution of the primary provisions of this protocol.

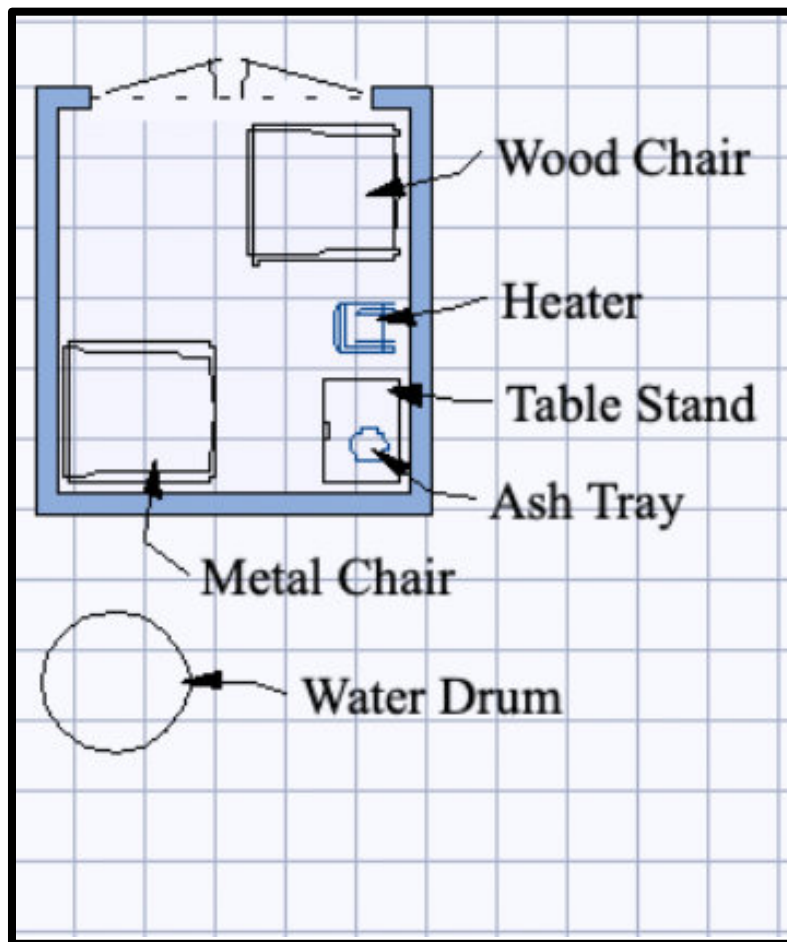
As a result of the continued joint inspection, additional physical evidence was identified, collected and preserved from the hostile fire incident scene and continued to be maintained by IC Specialty Services for the benefit of all the interested parties.





**Image:** Search grids in the room of origin and adjacent exterior area.





**Image:** Search grids of adjacent exterior area

The accumulative physical evidence collected and preserved from the hostile fire incident scene included:

IC SPECIALTY SERVICES ARTIFACT/EVIDENCE LOG 1			
<b>INSURED:</b>	Nuttall	<b>CLM # :</b>	5015617702
<b>Evidence Custodian:</b>	Cristal VanDongen	<b>FILE #:</b>	22-39937
<b>Item Number</b>	<b>Description</b>		<b>Date Collected:</b>
1	fire damaged hover board		4-Feb-22

<b>IC SPECIALTY SERVICES ARTIFACT/EVIDENCE LOG 2</b>			
<b>INSURED:</b>	Nuttall	<b>CLM # :</b>	5015617702
<b>Evidence Custodian:</b>	Alex Hoff	<b>FILE #:</b>	22-39937
<b>Item Number</b>	<b>Description</b>	<b>Date Collected:</b>	
1	Smoke detector	8/2 to 8/4, 2022	
2	Smoke detector	8/2 to 8/4, 2022	
3	Smoke detector	8/2 to 8/4, 2022	
4	Smoke detector	8/2 to 8/4, 2022	
5	Smoke detector	8/2 to 8/4, 2022	
6	Smoke detector	8/2 to 8/4, 2022	
7	Smoke detector	8/2 to 8/4, 2022	
8	Smoke detector	8/2 to 8/4, 2022	
9	Smoke detector	8/2 to 8/4, 2022	
10	mattress - northeast bedroom	8/2 to 8/4, 2022	
11	mattress - northeast bedroom	8/2 to 8/4, 2022	
12	remnants of smoke detector - SW bedroom	8/2 to 8/4, 2022	
13	battery from SW bath/bedroom 8.75 V	8/2 to 8/4, 2022	
14	debris from behind refrigerator	8/2 to 8/4, 2022	
15	battery SW bedroom 8.47 V	8/2 to 8/4, 2022	
16	motor from the threshold for bedroom #4	8/2 to 8/4, 2022	
17	smoke alarm base - garage, west wall	8/2 to 8/4, 2022	
18	smoke detector base - basement	8/2 to 8/4, 2022	
19	Weather Head	8/2 to 8/4, 2022	
20	Electrical circuit and breaker - bedroom #4	8/2 to 8/4, 2022	
21	Electrical circuits - bedroom #4	8/2 to 8/4, 2022	
22	electrical receptacle - garage	8/2 to 8/4, 2022	
23	face plates - bedroom #4	8/2 to 8/4, 2022	
24	circuit breaker - east exterior electrical receptacle	8/2 to 8/4, 2022	
25	charging cords - kitchen	8/2 to 8/4, 2022	

26	debris from floor of closet - bedroom #4	8/2 to 8/4, 2022
27	floor debris - bedroom #4	8/2 to 8/4, 2022
28	solid debris - exterior, east side of the structure	8/2 to 8/4, 2022
29	solid debris - exterior, east side of the structure	8/2 to 8/4, 2022
30	refrigerator	8/2 to 8/4, 2022
A1a.	Debris	8/2 to 8/4, 2022
A1b.	smoke detector components	8/2 to 8/4, 2022
A1c.	carpet and miscellaneous debris	8/2 to 8/4, 2022
A2a.	debris	8/2 to 8/4, 2022
A2b.	miscellaneous	8/2 to 8/4, 2022
A3a.	debris	8/2 to 8/4, 2022
A3b.	miscellaneous	8/2 to 8/4, 2022
B1a.	debris	8/2 to 8/4, 2022
B1b.	2 battery cells (hover board)	8/2 to 8/4, 2022
B1c.	miscellaneous debris	8/2 to 8/4, 2022
B2a.	debris	8/2 to 8/4, 2022
B2b.	debris	8/2 to 8/4, 2022
B3a.	debris	8/2 to 8/4, 2022
B3b.	debris	8/2 to 8/4, 2022
B3c.	debris	8/2 to 8/4, 2022
B3d.	debris	8/2 to 8/4, 2022
B3e.	miscellaneous	8/2 to 8/4, 2022
C1a.	debris	8/2 to 8/4, 2022
C1b.	miscellaneous	8/2 to 8/4, 2022
C2a.	debris	8/2 to 8/4, 2022
C2b.	miscellaneous	8/2 to 8/4, 2022
C3a.	debris	8/2 to 8/4, 2022
C3b.	debris	8/2 to 8/4, 2022
C3c.	miscellaneous	8/2 to 8/4, 2022
D1a.	debris	8/2 to 8/4, 2022
D1b.	miscellaneous	8/2 to 8/4, 2022
D2a.	electrical wiring	8/2 to 8/4, 2022
D2b.	portable heater and associated electrical	8/2 to 8/4, 2022

D2c.	extension cord	8/2 to 8/4, 2022
D2d.	ashtray	8/2 to 8/4, 2022
D2e.	misc. debris and electrical components	8/2 to 8/4, 2022
D2f.	light component	8/2 to 8/4, 2022
D2g.	aluminum wiring from beneath the weather head	8/2 to 8/4, 2022
D2h.	extension cord and electrical receptacle	8/2 to 8/4, 2022
D2i.	miscellaneous debris	8/2 to 8/4, 2022
D2j.	miscellaneous debris	8/2 to 8/4, 2022
D2k.	miscellaneous debris	8/2 to 8/4, 2022
D2l.	debris from above the solid mas	8/2 to 8/4, 2022
D2m.	debris	8/2 to 8/4, 2022
D2n.	debris	8/2 to 8/4, 2022

On Monday, October 30, 2023, at or about 9:00 AM (0900), and Tuesday, October 31, 2023, a joint inspection of physical evidence previously collected and preserved from the scene of the hostile fire incident was conducted. The joint inspection occurred at Palmer Engineering and Forensics located at 30 North Cutler Drive, Suite #404, North Salt Lake, Utah 84054. While I was not in attendance, I later reviewed the written protocols which guided the joint inspection and reviewed and analyzed photographic documentation provided of same.

On February 29, 2024, the remains of the artifact Jetson hoverboard which was previously preserved and collected from the hostile fire incident scene was visually documented and inspected. I was not in attendance at this inspection. This inspection was commenced pursuant to a written inspection protocol developed and written by Berkeley Engineering and Research, Inc.

The methodology for this continued inspection included the following:

- “Visual inspection.
- X-Ray may be used to determine if any items of interest are obstructed from visual inspection. If so, a removal/extraction method will be discussed and agreed upon that will

allow visual inspection of the item(s).

- If there is interest in selecting individual battery cells for CT scan, removal/extraction of these cells will be discussed and agreed upon. Any removed cells will be sent out for CT scanning after the inspection is completed.”

On or about March 16, 2024, I read and reviewed the transcripts of the discovery depositions of the plaintiffs, Matthew Wadsworth and Stephanie Wadsworth.

On or about June 1, 2024, I read and reviewed the transcript of the discovery deposition of the plaintiffs’ juvenile daughter, Kamille Wadsworth. During that review, I noted the following data and information:

- That she only used the charger that came with the artifact Jetson hoverboard.
- That she believes that she was the last person to ride the artifact Jetson hoverboard and did so the day before the fire in the bedroom of her brothers, Gunner Wadsworth and Layne Wadsworth.
- That she rode the artifact Jetson hoverboard until “it died” and then plugged it in to recharge it behind her brothers’ bedroom door.
- That she does not believe that her brothers, Gunner Wadsworth and Layne Wadsworth, rode the artifact Jetson hoverboard after that.
- That she last rode the artifact Jetson hoverboard around bedtime.
- That she was awoken by the “fire alarms.”
- That she sleeps in “Bedroom 3.”
- That she got up and went to the living room where her brothers, Gunner Wadsworth and Layne Wadsworth, were yelling.

- That Gunner Wadsworth was in the process of attempting to wake their mother up.
- That she then helped him wake her up.
- That she doesn't recall smoke in the hallways but did observe a glow of the fire on the paneling through the door in her brother's bedroom.
- That she observed the wall of her brother's bedroom and their bed on fire.
- That she and her brothers, Gunner Wadsworth and Layne Wadsworth, left the house through the door that goes from the kitchen to the garage.
- That her mother attempted to open the front door and told them there was too much heat.
- That her mother then left them to go rescue Weston.
- That she and her brothers, Gunner Wadsworth and Layne Wadsworth, left the house because the smoke was too bad.
- That when she got outside, she observed that the yellow shed was in the process of melting.
- That one of the reasons that she couldn't see outside is because the curtains were closed.
- That she heard a loud bang at one point.
- That when she got outside, she was able to see the shape of the shed.
- That the roof and overhang over the window were not on fire.
- That no other portions of the outside of the house were on fire.

- That she heard the bang sound right before she left the house.

On or about June 1, 2024, I also read and reviewed the transcript of the discovery deposition of the plaintiffs' juvenile son, Layne Wadsworth. During that review, I noted the following data and information:

- That he rode the artifact Jetson hoverboard the day before the fire with sister, Kamille Wadsworth and his brother Gunner Wadsworth in his room.
- That was the first time he had ridden it.
- That he usually goes to bed at 8:00 PM.
- That he woke up when his brother, Gunner Wadsworth, got up to go to the bathroom and banged the door against the wall.
- That his brother, Gunner Wadsworth, tried closing the bedroom door when he came back from going to the bathroom, but it bounced back open against the wall.
- That he next woke up from the window breaking.
- That he was sleeping on the lower bunk bed.
- That he got up and went to the living room to wake up his mother.
- That he also saw fire at the artifact Jetson hoverboard, the carpeting along the wall from the hoverboard to the bedroom closet and inside the bedroom closet.
- That the artifact Jetson hoverboard was behind the door.
- That he also saw a little bit of fire seeping out from where the window was underneath the top bunk bed.

- That when he got outside, he observed fire on the front porch and the wall area by his bedroom.
- That he could not see the yellow shed – it was gone.
- That no part of his body was on fire.
- That no part of his blanket or comforter was on fire – other than a spark that landed on the blanket he was carrying.
- That when he got outside, the shed was melting and there was glass on top of it.
- That when he woke up, he heard the smoke alarms.
- That he heard a loud bang from in the hallway when they were in the kitchen.

On or about June 1, 2024, I also read and reviewed the transcript of the discovery deposition of the plaintiffs' juvenile son, Gunner Wadsworth. During that review, I noted the following data and information:

- That he remembers using the artifact Jetson hoverboard all day the day before the fire, plugging it in and then using it again before getting ready for bed.
- That he used the artifact Jetson hoverboard in his bedroom.
- That he and his brother, Layne Wadsworth, took turns with it.
- That his sister, Kamille Wadsworth, was using the artifact Jetson Hoverboard as well.
- That that he was using the artifact Jetson Hoverboard in the morning and daylight and mid-afternoon, but not once it turned dark.



- That he and all his siblings went to bed at around the same time – 8:00 PM to 8:30ish PM.
- That when they were done using it, they would place it by the bedroom door – “like in the crack of the door.
- That he woke up once before the fire to use the bathroom while Layne was still sleeping.
- That when he got back to the bedroom, he fell back asleep on the top bunk bed.
- That there were curtains on the bedroom window which are typically open during the night – they open from the middle.
- That after going to back to sleep after using the bathroom, he was awoken by his brother, Layne Wadsworth, yelling at him.
- That he first saw fire by the window and then saw flames “licking up” from underneath the bedroom door near where the artifact Jetson hoverboard was located.
- That his brother, Layne Wadsworth, was already in the hallway with the bedroom door opened when he woke up to his brother's yelling.
- That he remembers when waking up that there were two shards of glass in his bed.
- That he felt heat on his back.
- That he heard a bang “slightly” after standing up from a chair getting ready to leave the kitchen.
- That when he got outside, he observed just outside the top of the bedroom window – the top of the shed was on fire.
- That he saw the porch by the front door on fire.

- That he saw a stump by the shed was also on fire.
- That the smoke alarms were going off when he first woke up.
- That when he left his bedroom, the fire was following along the wall and coming out from underneath the bedroom door.
- That he did not see the shed on fire through the bedroom window when he woke up.
- That when he woke up, there was fire on his bedding more so than the window.
- That other types of batteries were kept in the same corner as the artifact Jetson hoverboard.
- That the bedroom door bounced back open when he tried to close it after coming back from using the bathroom.
- That there was a crack between the bedroom door and the artifact Jetson hoverboard.
- That the bedroom door wasn't touching the artifact Jetson hoverboard when he got back from the bathroom – it was a “little bit” away.
- That the fire he saw and felt on his back was inside the house – not outside.
- That he saw flames that were coming out from underneath the bedroom door.
- That he saw fire on the top of the shed – melting down.
- That the porch he saw on fire is the same porch that they have now.
- That he did not observe the wall of the house on fire.

On or about July 10, 2024, I compiled all the relevant documents and imagery and created an electronic case file. I subsequently read and reviewed all the compiled contents of that electronic case file.

As a continuing part of my forensic investigation and analysis, I have reviewed an extensive compilation of relevant case file materials and discovery materials generated and compiled during the course of the continuing civil litigation to date. Collectively, those relevant case file and discovery materials included the following:

- Compilation of news media coverage of the hostile fire incident.
- Compilation of information on insurance company's retained expert.
- Compilation of Green River, Wyoming Buildings and Building Regulations and Fire Prevention and Protection codes.
- Compilation of hostile fire incident scene joint inspection protocols.
- Compilation of hostile fire incident scene inspection attendance
- Web-based user manual for Jetson Illuminated Hoverboard – Models JPLSM-BLK and JPLSM-IRS.
- Web-based catalog page images for Plasma Luminous All-Terrain Hoverboard.
- BEAR Proposed Inspection Protocol for Wadsworth Hoverboard.
- Compilation of x-ray images of the subject Jetson hoverboard.
- Sweetwater County Sheriff's Department Incident Report for Incident #S22-01535.
- Compilation of Sweetwater County Sheriff's Department dash cam images.

- Compilation of Sweetwater County Sheriff's Department body cam images.
- Compilation of Sweetwater County Sheriff's Department's photographs (DSC\_001.JPG – DSC\_0191.JPG).
- Compilation of Sweetwater County Sheriff's Department's Wadsworth family interview audio recordings.
- Compilation of Sweetwater County Sheriff's Department's Wadsworth family interview video recordings.
- Compilation of Sweetwater County Sheriff's Department's Ryan Pasborg interview video recording.
- Sweetwater County Sheriff's Department's Wadsworth family Christmas 2021 photograph.
- Sweetwater County Sheriff's Department's Jetson Plasma Iridescent Hoverboard online information image.
- Compilation of Google Earth images of the hostile fire incident location.
- Compilation of diagrams of the hostile fire incident scene.
- Matterport data file link to the hostile fire incident scene.
- Compilation of Matterport "doll house" images of the hostile fire incident scene
- Compilation of Matterport photograph mosaics of the hostile fire incident scene.
- Compilation of Matterport generated floorplans.

- Compilation of incident scene photographs taken by Austin Birdsong.
- Compilation of structural notes compiled by Austin Birdsong.
- Catalog image of Comfort Zone Electric Shop Heater, CZ250, Black.
- Photograph of Walmart receipt dated 12/12/21 – including “JETSON PLAS 081199103159 128.00 X” and 2YR SVC PLAN 084375518445 15.00 N”.
- Sweetwater County Sheriff’s Department’s Realtor.com photograph of the bedroom hallway.
- Transcript of the discovery deposition of Ryan Pasborg – Passerby
- Transcript of the discovery deposition of Jeff Sheaman – Sheriff’s Detective
- Transcript of the discovery deposition and exhibits of Matthew Wadsworth – Plaintiff
- Transcript of the discovery deposition and exhibits of Stephanie Wadsworth – Plaintiff
- Transcript of the discovery deposition of Gunner Wadsworth – Juvenile Son
- Transcript of the discovery deposition of Layne Wadsworth – Juvenile Son
- Transcript of the discovery deposition of Kamille Wadsworth – Juvenile Daughter
- Transcript of the discovery deposition and exhibits of Sam Husain – Corporate Representative of Jetson Electric Bikes.
- Transcript of the discovery deposition and exhibits of Coryn Kremers – Corporate Representative of Walmart.

All of the aforementioned case file and discovery materials are maintained at the offices of M.J.

Schulz & Associates, Inc. for the above captioned matter and should be considered a part hereof.

As another part of my investigation and analysis, I also obtained relevant data and information from another consulting expert, Dr. Rondinone of Berkeley Engineering and Research, Inc, who was also retained by the aforementioned client. His role focused of the detailed inspection and analysis of the artifact Jetson hoverboard and particularly its lithium ion battery source.

The forensic investigation and analysis continue at the request of the aforementioned client.

## **Findings and Conclusions**

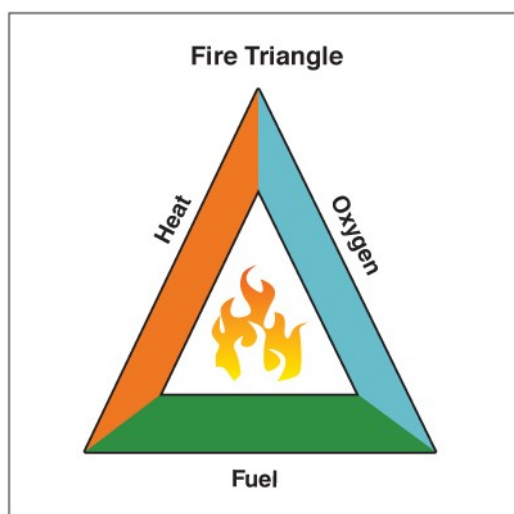
As a result of the forensic investigation and analysis, I was able to come to certain findings and conclusions. Those findings and conclusions focus on the evaluation of the initiation of the hostile fire incident, the evaluation of the nature of the hostile fire incident, the evaluation of the origin of the hostile fire incident, the evaluation of the first fuel ignited in the hostile fire incident, the evaluation of the ignition sequence (cause) of the hostile fire incident, the evaluation of the classification of the cause of the hostile fire incident, the evaluation of the development and propagation of the hostile fire incident, the evaluation of the effects of the hostile fire incident on the victims, and the responsibility for the occurrence of the hostile fire incident and its adverse and undesired consequences relative to personal injuries and property damage.

## **Initiation of the Hostile Fire Incident**

As defined earlier in this report of forensic investigation and analysis, a fire is defined as a rapid oxidation process, which is an exothermic chemical reaction, resulting in the evolution of light and heat in varying intensities. Closely related and previously defined, combustion is a chemical process of oxidation that occurs at a rate fast enough to produce heat and usually light in the form

of either a glow or flame. This combustion process can be simply characterized and graphically considered with a discussion of the fire triangle and fire tetrahedron.

The fire triangle visualization is founded on the principle that three (3) elements must be present and in a proper relationship with one another before the combustion process can initiate. These three (3) elements include a fuel source, an oxidizing agent, and a competent source of heat energy. Stated differently, a fire (combustion) cannot occur unless a fuel source is ignited by a competent source of ignition (heat energy) contemporaneous with a sufficient quantity or concentration of oxygen (air).



**Figure:** *Graphic Depiction of the Fire Triangle*

A fuel is defined as any material that yields heat energy through the combustion process. In other words, a fuel is anything that can undergo combustion. Fuels most commonly encountered are comprised of chemistries including carbon, hydrogen and oxygen and are, therefore, organic in nature. Fuels can normally initially exist in any of the three (3) states or phases of matter, namely, solid, liquid or gas.

An oxidizing agent is defined as any material that yields oxygen during a chemical reaction. Most

often, the source of this oxygen is from ambient air (atmospheric) which normally contains approximately twenty-one (21%) percent oxygen. A concentration of greater than one percent (1%) oxygen is generally all that is necessary for combustion to occur. Stated differently, combustion can continue to occur with oxygen concentrations approaching as little as one percent (1%) under certain circumstances. Flaming combustion is generally accepted to occur above the range of fifteen (15%) to sixteen (16%) percent oxygen.

Heat is defined as a form of energy characterized by the vibration of molecules and capable of initiating and supporting chemical changes and changes of state. In the combustion process, this heat energy usually causes the chemical decomposition of a combustible material (pyrolysis) yielding combustible or flammable fuel vapors. The same heat energy, then, generally raises those vapors above their ignition temperature resulting in their ignition.

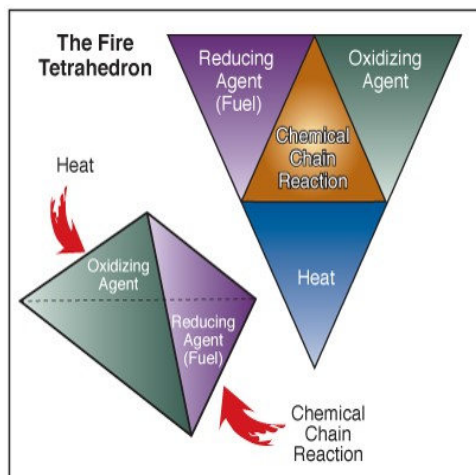
Besides their mere contemporaneous presence, the aforementioned three (3) elements must be in a proper relationship with one another. Most important, the fuel vapors must intermix with oxygen in proportional quantities and/or concentrations such that combustible mixtures or flammable mixtures are formed.

The fire tetrahedron visualization adds a fourth element which must occur in order for the combustion process to continue after its initiation. This element is termed the uninhibited chemical chain reaction.

The uninhibited chemical chain reaction is defined as the continuing occurrence of chemical reactions because of the initiation of the combustion process. The continuing and uninhibited chemical chain reaction only occurs when heat energy produced by the initial combustion reaction (initiation of the fire) is transferred back to the fuel source. This transfer of heat energy results in additional pyrolysis of the fuel source and, therefore, additional fuel vapors to be consumed in the continuing combustion process.



Once the uninhibited chemical chain reaction begins, the original source of heat energy no longer needs to be present. Combustion continues until extinguished.



**Figure:** *Graphic Depiction of the Fire Tetrahedron*

An illustrative example of this element would include the placement of a lighted match at the corner of a piece of paper. The heat energy from the flame of the match quickly pyrolyzes the piece of paper producing combustible or flammable fuel vapors. These fuel vapors are, in turn, ignited by the flame of the match. The new and additional heat energy yielded by the combustion of the fuel vapors is transferred back to the piece of paper initiating and repeating the same chemical reaction. The series of uninhibited chemical chain reactions continue, and the piece of paper burns even if the flame of the match is removed.

It should be obvious that in order for a hostile fire incident to occur there must first be an ignition of an initial or first fuel. Ignition can be simply defined as the process of initiating self-sustained combustion. Following ignition, the hostile fire incident may self-extinguish, or it may grow and become a threat to life and property. This forensic investigation and analysis was clearly of a hostile fire incident, that has done the latter.

After its ignition, then, the hostile fire incident continued to grow and spread beyond the point of

ignition. This flame spread can actually be thought of as a series of piloted ignitions and the self-sustained combustion continued to propagate to and involve secondary fuel sources.

This growth will result in a transition to established burning. Established burning is generally defined as a fire, which has a ten (10) inch flame and/or is producing twenty (20) kW. More simply stated, established burning results in a hostile fire incident which will generally not go out on its own unless suppression is initiated. The hostile fire incident is now said to be in the free-burning stage. In this stage, the fire will continue to grow as long as there is sufficient ventilation and additional fuel is available.

The occurrence of this hostile fire incident was determined to be a direct result of such an initiation of the combustion process. A more specific discussion of the initiation of that combustion process and its development and propagation is included within this report of forensic investigation and analysis.

The forensic investigation and analysis continue consistent with the scientific method.

### **Nature of the Hostile Fire Incident**

The nature of this hostile fire incident was the undesired and adverse failure of lithium-ion battery cells in a Jetson branded Plasma Illuminated (Iridescent) Hoverboard marketed and imported by Jetson Electric Bikes LLC., 86 34<sup>th</sup> Street, 4<sup>th</sup> Floor, Brooklyn, NY 11232 and sold by Walmart, Inc. at its retail store located at 201 Gateway Boulevard, Rock Springs, WY 82901 on 12/12/21. The model number of the involved hoverboard is JPLSM-IRS. The identifier on the Walmart cash register receipt is 081199103159.

The forensic investigation and analysis continue consistent with the scientific method.

## **Origin of the Hostile Fire Incident**

In order to facilitate an accurate evaluation of the first fuel ignited in the hostile fire incident, the ignition sequence (cause) of a hostile fire incident, the development, progression, propagation and fire flow path of a hostile fire incident, the consequences of a hostile fire incident or the responsibility for the occurrence of a hostile fire incident, it is necessary to first evaluate and determine its origin.

The accurate determination of the origin of any hostile fire incident, then, is based primarily upon the analysis of the fire effects and fire patterns present within the hostile fire incident scene, or in this case. This analysis is predicated on a thorough understanding of fire dynamics and fire behavior, as well as a practical understanding of fire effects and fire patterns.

Fire effects are defined as the observable or measurable changes in or on a material as the result of a fire. An understanding of fire effects allows me to recognize fire patterns. Fire patterns are defined as the visible or measurable physical changes, or identifiable shapes, formed by a fire effect or group of fire effects.

Fire patterns can be generally characterized as one of three (3) types, namely, movement fire patterns, intensity fire patterns and combination fire patterns. Movement fire patterns are those that generally provide physical evidence as to the origin, direction of travel and movement of the by-products of combustion. Intensity fire patterns are those that generally provide physical evidence as to the severity of the physical effects of the by-products of combustion on materials. And lastly, combination fire patterns are those that generally provide physical evidence as to both.

Fire patterns are actually the physical manifestations of the origination, development, and progression of a fire plume. The development of a fire plume occurs in three definable phases. These phases include the triangular phase, the columnar phase, and the conical phase.

In the triangular phase of development, the fire plume is primarily influenced by the flame zone located at its base within the interface with the fuel. Fire patterns generated during this phase are similarly defined by the flame zone.

In the columnar phase of development, the fire plume is influenced by both the flame zone and the thermal column that forms directly above the flame zone. The formation of the thermal column above the flame zone is directly influenced by the super-heating of the by-products of combustion, the atmospheric pressure differentials between the developing fire plume and the environment around it, the entrainment of cooler air by the fire plume from the environment around it, and gravity.

In the conical phase of development, the fire plume continues to be influenced by the flame zone and the thermal column, as well as its response to factors and circumstances that tend to restrict its free development. Such factors and circumstances include, but are not limited to, physical compartmentation, obstructions, and atmospheric pressure. A fire plume is said to have matured when it reaches the conical phase of development.

The prominence in which visible manifestations of the three phases remain following the extinction and/or extinguishment of in a hostile fire incident is dependent upon a number of different variables. These variables are generally related to the extent of the confinement of the developing fire plume.

The recognition, identification and interpretation of these fire patterns are accomplished through an analytical process termed heat and flame vector analysis. The performance of a heat and flame vector analysis is an accurate methodology through which the origin of a hostile fire incident can be determined.

This analytical process continued throughout the forensic investigation and analysis but was most prominent while determining the room of origin of the hostile fire incident within the involved

residential structure, while determining the origin within that room of origin, and during the process of evaluating competing hypotheses regarding same.

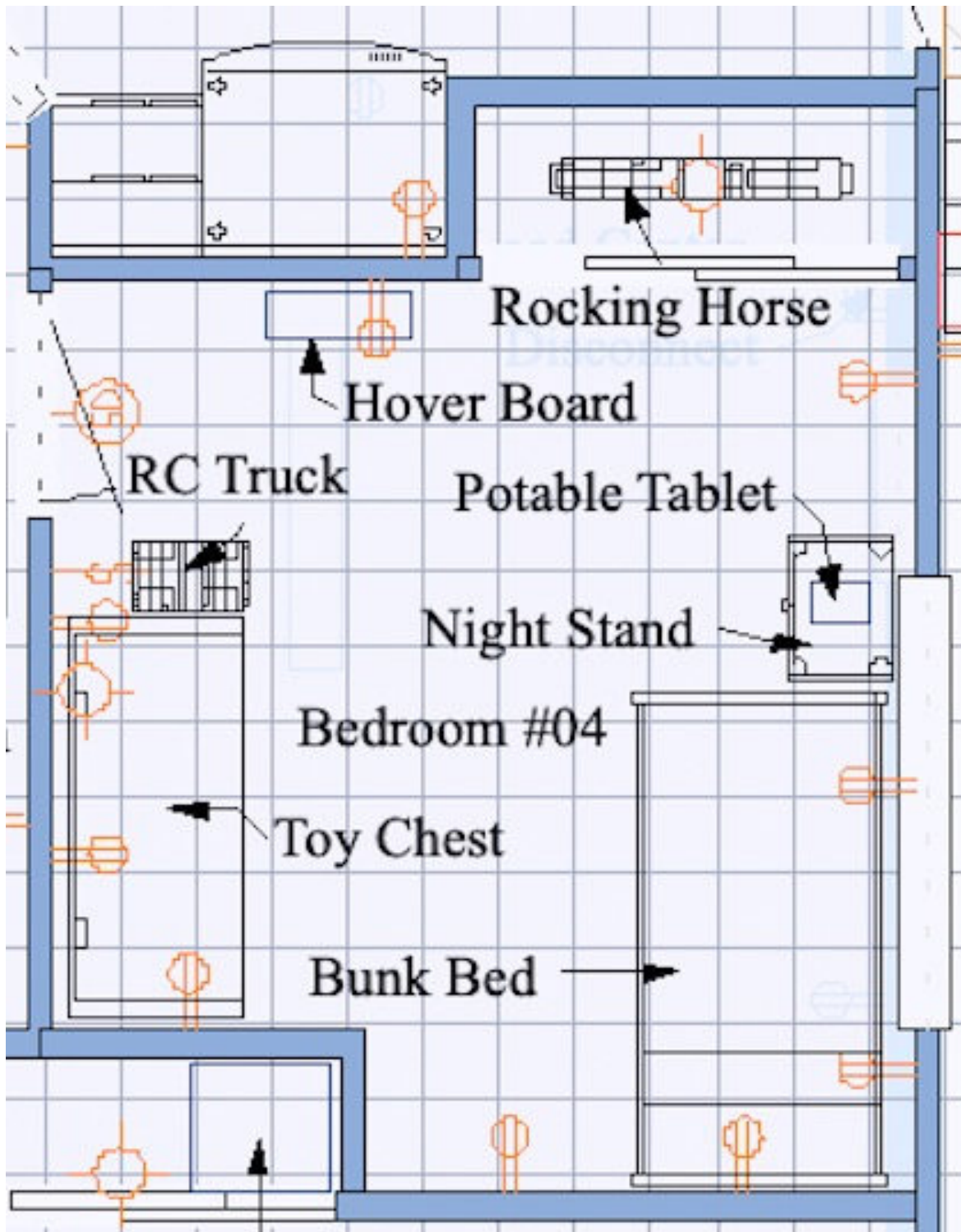
In addition to the forensic investigation and analysis of the physical evidence in a hostile fire incident scene achieved through the performance of a heat and flame vector analysis, the determination of the origin of a hostile fire incident may also include the analysis of information and data obtained from other sources including, but not limited to, the following:

- The observations of witnesses to the initiation, development, propagation, and consequences of the hostile fire incident.
- The application and analysis of arc mapping, when applicable or possible.
- The evaluation of fire dynamics including explosion dynamics, fire development and fire plume progression and development.

The forensic investigation and analysis determined that the origin of the hostile fire incident was located on the west wall of the bedroom located on the north side of the bedroom hallway immediately adjacent to or behind the kitchen.

This determination is clearly supported by the careful and systematic evaluation and analysis of the following:

- The observations of the witness who was first to discover and arrive at the hostile fire incident scene.
- The observations of the occupants present within the scene of the hostile fire incident scene.
- The analysis of the fire effects which manifested within the hostile fire incident scene.



**Diagram:** *Room of origin.*

- The analysis of the fire patterns which manifested within the hostile fire incident scene.
- The analysis of the distribution of thermal damage present within the hostile fire incident scene.
- The analysis and evaluation of the fuel load (s) present within the scene of the hostile fire incident.
- The evaluation of the potential sources of ignition that were present within the scene of the hostile fire incident.

In the simplest of terms, the accurate determination of the origin of a hostile fire incident requires the careful consideration of the following requisite elements:

- The presence of sufficient ventilation - air or oxygen.
- The presence of a competent fuel source.
- The presence of a competent source of ignition.

The forensic investigation and analysis continue consistent with the scientific method.

### **First Fuel Ignited in the Hostile Fire Incident**

The first fuel ignited in any hostile fire and explosion incident is necessarily located within its area of origin where that first fuel ignited comes in contact with a competent source of ignition (heat energy) contemporaneous with a sufficient amount of air or oxygen. The accurate determination of the hostile fire incident's origin identifies the location of the first fuel ignited.

The first fuel ignited in this hostile fire incident was determined to be the electrolyte in the first failed lithium ion battery cell. Secondary fuels included other available combustibles.

The forensic investigation and analysis continue consistent with the scientific method.

### **Ignition Sequence (Cause) of the Hostile Fire Incident**

The evaluation of the ignition sequence (cause) of any hostile fire incident includes the identification of the first fuel ignited; the identification of a competent source of ignition for that fuel; and the analysis of how the first fuel ignited and the competent source of heat energy came together contemporaneous with a sufficient quantity or concentration of oxygen (air).

The ignition sequence (cause) of this hostile fire incident was determined to be the ignition of the available combustibles from an exothermic failure of a lithium-ion battery assembly in the artifact Jetson hoverboard located within the area of origin of the hostile fire incident and the adverse and uncontrolled transfer of heat energy from same.

A competent source of ignition is one that has the following properties:

- Sufficient temperature relative to the first fuel ignited.
- Sufficient heat energy relative to the first fuel ignited.
- Sufficient duration relative to its exposure to the first fuel ignited.
- Ability to transmit its heat energy to the first fuel ignited.

The forensic investigation and analysis continue consistent with the scientific method.

### **Classification of Cause of the Hostile Fire Incident**

The cause of any hostile fire incident can be defined as the circumstances, conditions or agencies that bring together a competent fuel source, a competent source of ignition for that fuel source and



a sufficient concentration of air or oxygen resulting in a fire/explosion incident. The interaction or sequence of events that bring together these three (3) elements is termed its ignition sequence and was discussed previously in this report of investigation and analysis. Hostile fire incidents are classified as natural, accidental, incendiary, or undetermined.

Natural causes are those that occur without direct human intervention or action, such as hostile fire incidents resulting from lightning, earthquake, wind, and flood.

Accidental causes are those that occur without an intentional human act that was intended to ignite or promote the spread of a hostile fire incident to an area where it should not be.

Incendiary causes are those that occur with a deliberate act with the intent to cause a hostile fire to occur in an area where the fire or explosion should not be.

And lastly, undetermined causes are those that cannot be accurately classified as either natural, accidental, or incendiary because the cause cannot be proven to an acceptable level of certainty. As a result of the investigation and analysis, the investigating expert determined that the classification of the cause of this hostile fire incident was properly classified as accidental, in that it was not intentionally set.

It is important to note, that most hostile fire incidents that are appropriately classified as accidental are preventable and the occurrence of this hostile fire incident is no exception.

The forensic investigation and analysis continue consistent with the scientific method.

### **Development, Progression, Propagation of the Hostile Fire Incident**

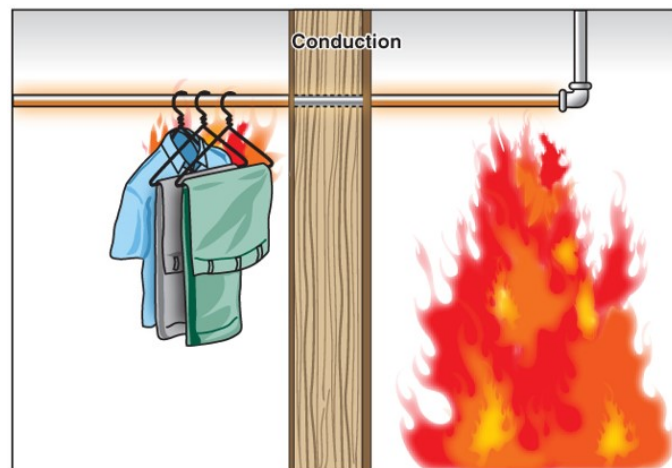
During and following the initiation of this hostile fire/explosion incident, it developed and

propagated through the transfer of heat energy by through each of the heat energy transfer methods - conduction, convection, and radiation. The cumulative transfer of heat energy would have eventually resulted in flame temperatures (luminescent gas) exceeding 2500 degrees Fahrenheit.

As a comparison, hot water in excess of only 120 degrees Fahrenheit will immediately begin to scald human skin tissue resulting in significant burn injuries.

Conduction is defined as the transfer of heat energy through a solid medium. An illustrative example of conduction would be the transfer of heat energy through a metallic pot or pan on an operating stove through the metal base to its handle. In this instance, the heat energy is passed from molecule to molecule. The occurrence of conduction results in the handle being hot.

While conduction is normally not the primary method of heat energy transfer in most hostile explosion incidents, its presence should not be discounted.



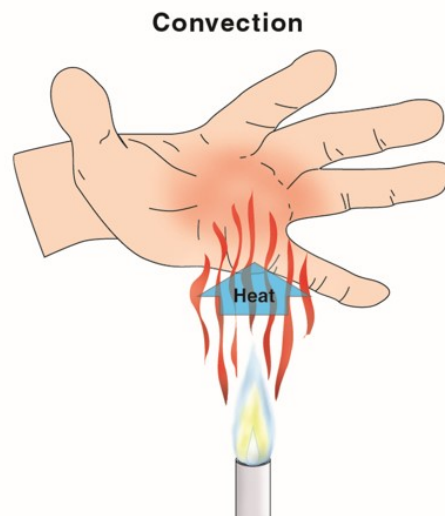
**Graphic:** *Conduction as a method of heat energy transfer.*

Convection is defined as the transfer of heat energy through a circulating medium such as a liquid or gas. An illustrative example of convection through a liquid would be the transfer of heat energy through the water of a filled bathtub. The occurrence of convection through a liquid results in the

water in the filled bathtub being uniformly heated.

An illustrative example of convection through a gas would be the transfer of heat energy by a forced air furnace. The occurrence of convection through a gas is the operational principle upon which the forced air furnace operates and heats a building.

In many hostile explosion incidents, the transfer of heat energy through convection is a dominant mechanism for its progression and development. This observation, however, clearly does not minimize the effectiveness and efficiency of the other heat transfer mechanisms in a hostile explosion incident.



**Graphic:** Convection as a method of heat energy transfer.

Radiation is defined as the transfer of heat energy through electromagnetic waves. An illustrative example of radiation is the sun. The sun heats the surface of the earth through radiation.



**Graphic:** Radiation as a method of heat energy transfer.

The transfer of heat energy through these three methods begins to occur upon the ignition of the first fuel ignited. Thereafter, the continuing chain reaction, graphically represented earlier by the fire tetrahedron, results in the fire's propagation to secondary fuel sources.

In addition to the heat energy, the combustion process results in the production of a wide variety of matter and species known collectively as by-products of combustion. These by-products of combustion include, but are not limited to, solid particulates which constitute the visible smoke, tarry aerosols, water droplets, super-heated air, super-heated gases, and combustion gases. The latter, combustion gases, varies greatly depending upon the type(s) and nature(s) of the fuel source(s) involved in the combustion process.

The forensic investigation and analysis continue consistent with the scientific method.

## **Responsibility for the Occurrence of the Hostile Fire Incident**

Besides the evaluation of a hostile fire incident's origin and ignition sequence (cause), forensic fire investigation and analysis also evaluates the responsibility for its occurrence.

Certainly, the plaintiffs in this civil litigation had no control over the design and control of the artifact Jetson hoverboard. In addition, there is no evidence that the plaintiffs used the artifact Jetson hoverboard for any purpose other than was reasonably intended. And lastly, there is no evidence that the plaintiffs misused the artifact Jetson hoverboard – neither intentionally nor otherwise.

A safety hazard can be defined as a condition that presents or exposes the end user (s) of a product to an unreasonable risk of serious injury, death or property damage when the product is utilized for its intended or reasonably foreseeable purposes and under circumstances and conditions that were reasonably foreseeable.

A fire/explosion safety hazard, then, can be more specifically defined as any condition that presents or exposes the end user (s) of a product to an unreasonable risk of serious injury, death or property damage as a direct consequence of the occurrence of a hostile fire/explosion incident.

Viewed through the lens of fire safety, the forensic investigation and analysis, including the work of other the consulting expert, determined that the responsibility for the occurrence of the hostile fire incident and its adverse consequences rests with those entities which placed the artifact Jetson hoverboard into the stream of commerce – both the manufacturer and the retailer of same.

## **Evaluation of Potential Competing Hypotheses**

As part of the process of applying the scientific method, the intellectual standards of critical thinking, the process of the analysis of potential competing hypotheses and the generally

recognized and accepted practices and methodologies of the fire and explosion investigation and analysis profession, different and competing hypotheses relative to the origin and ignition sequence (cause) of the hostile fire incident were considered and evaluated.

In the end, only the hypotheses stated herein proved to be plausible given the careful and thorough scrutiny through the application of the aforementioned investigative and analytical methodologies, its comparison to the physical evidence, its consideration relative to reported witness observations, its evaluation with respect to fire dynamics and its evaluation with respect to the work of the other consulting expert.

To the contrary, the remaining potential competing hypotheses, when objectively evaluated and considered against the totality of all of the available data and information were found to be implausible.

The forensic investigation and analysis continue consistent with the scientific method.

### **Testing of the Final Hypotheses**

Consistent with the generally recognized and accepted practices and methodologies of the fire and explosion investigation and analysis profession, all the hypotheses expressed in this report of the forensic investigation and analysis were tested using the following methods:

- Use of the scientific method.
- Use of analytical thinking models.
- Use of deductive reasoning.
- Use of scientific literature.
- Comparison to principles of science

- Use of cognitive experiments.

### **Certainty of Opinions**

As aforementioned, unless otherwise stated, each finding and conclusion listed herein was reached and is expressed with a reasonable degree of certainty within the field of fire and explosion investigation and analysis. This level of certainty is only attainable through the application of the scientific method, the intellectual standards of critical thinking, the analysis of competing hypotheses, the guidelines of the National Fire Code NFPA 921 and the guidelines of the National Fire Code NFPA 1033 as was previously affirmed.

### **Status of the Forensic Investigation and Analysis**

This report of the forensic investigation and analysis is submitted based upon the status of the forensic investigation and analysis as of the date of its issuance.

As indicated earlier, the forensic investigation and analysis was conducted utilizing the scientific method, intellectual standards of critical thinking and the process of the analysis of potential competing hypotheses. As such, should new or additional information or data be received following the issuance of this report of investigation and analysis, such information and data will be appropriately considered and evaluated.

Should such consideration and evaluation significantly impact the findings and conclusions expressed herein, it may become necessary to issue additional supplemental reports of the forensic investigation and analysis. In that event, the reader is cautioned to consider the contents of all such reports collectively.

As such, the information contained within this report of the forensic investigation and analysis

relative to any and all investigative activities and analyses should only be considered to be current as of the date of its issuance.

### **Supplements to the Report of the Forensic Investigation and Analysis**

The following supplements are attached to this report of investigation and analysis and should be considered a part hereof:

- Current Curriculum Vitae of Fire and Explosion Analyst, Fire and Safety Engineering Technologist, Michael Schulz, M.S.
- Current Rate Schedule of M.J. Schulz & Associates, Inc.
- Testimony listing of Michael Schulz, M.S.

### **Distribution of the Report of the Forensic Investigation and Analysis**

This report of the forensic investigation and analysis was prepared at the request of the aforementioned client and was intended for the client's exclusive use. As such, any additional distribution and/or reproduction of same should be done so only with the aforementioned client's express or mutually agreed permission.

Should the possession of this report of the forensic investigation and analysis occur without such permission, it should be immediately forwarded to the aforementioned client and/or M.J. Schulz & Associates, Inc. at 915 Highland Pointe Drive, Suite 250, Roseville, California 95678.

Respectfully submitted,

**M.J. Schulz & Associates, Inc.**



*Michael Schulz, M.S.*  
PRINCIPAL

**Michael J. Schulz, M.S.**  
**Fire and Explosion Analyst**  
**Fire and Safety Engineering Technologist**  
**Certified Fire Protection Specialist**